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Effects of Cognitive State, Cognitive Trait, and Subliminal Psychodynamic Activation upon Competitive Performance

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Effects Of Cognitive State, Cognitive Trait, And
Subliminal Psychodynamic Activation Upon
Competitive Performance

by

Robert C. Casas

A Thesis Submitted to the Faculty of the Graduate
School of Loyola University of Chicago in
Partial Fulfillment of the Requirements
for the Degree of Master of Arts

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VITA

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Chapter 1

Introduction

A persistent and nagging question in the history of western intellectual thought concerns the nature of human knowledge, and its corollary, that of the nature of human thought processes. A statement attributed to Heraclitus (500 B.C.) is not encouraging to those seeking answers to these questions: "You will not find the boundaries of soul by travelling in any direction, so deep is the measure of it" (Burnett, 1920, p. 138). Affronted by the archaic terminology, most contemporary psychologists would reject the relevance of this statement by a historical cousin to their current efforts to understand human thought processes. However, a moment's reflection will show that a metaphor inherent in Heraclitus' assessment is imbedded solidly in our common western intellectual tradition, a tradition we are yet dependent upon today.

This dependence is most evident in the metaphorical framework which has travelled through history and remains with us. Heraclitus looked for the nature of man in depth. It is the metaphor, mind=depth, and its related assumption that the true nature of man lies in the deeps, the subtle undercurrents hidden below facile surfaces, which has been bequeathed to us. Hillman (1980) has explored the relevance of this metaphor for the

history of dynamic psychology, and has shown how pervasive it is in our contemporary ideas of the dream and fantasy, those two enigmatic products of the mind. But it is not only in dynamic psychology, where "causes" of behavior are sought in unconscious (below the surface of awareness) impulses; but, also in much more contemporary, "less" metaphorical theories, such as the "depth of information-processing" model of memory, where "depth" still connotes causation. The reader is referred to Hillman (1980) for a more extensive appraisal and sampling of the role of this metaphor in psychological thinking. Here, this brief reminder should serve to alert the reader to the historical nature of the question addressed in this report.

While the quest for the nature of human knowledge is ancient, it is a much more contemporary figure who gave an answer establishing the assumptive framework for contemporary thinkers. It was Freud, at the turn of this century, responding to our culture's most persistent psychological question - Know thyself - who answered: To know yourself, know your past. Freud's cultural contribution, then, is in his establishment of a method for answering Heraclitus, and our intellectual forebearors from Oedipus to Socrates through Hamlet and Faust (Hillman, 1977).

Whereas Heraclitus despaired of finding the

boundaries of the "soul", contemporary thinkers, following Freud's methodology, have studied these boundaries. One boundary phenomena, "subliminal perception", was directly referred to by Freud (1900/1967, p. 284, footnote), and has a long history of contemporary research efforts subsequent to his notice. Freud (1900/1967) had briefly noted the experimental investigations conducted by Poetzl (1917/1960) on the role of unnoticed stimuli in dream formation in his magnum opus, The Interpretation of Dreams. While Freud was later to disparage efforts to experimentally verify his theory (Hall and Lindsay's, 1974, chapter on Freud), believing his clinical methodology more than sufficient; later psychoanalytic researchers took notice of Freud's positive appraisal of Poetzl's work, and have considered it an important research method ever since.

For example, Klein (1959,1967) used the method to investigate the differential effects of peripheral versus focal awareness of stimuli and ideas on subsequent perception and thought. Klein believed imputing stimuli at subliminal levels could influence peripheral trains of thought. Pine (1964) in a theoretical extension of Klein's model, suggested the effect of a subliminal stimulus was often indirectly or symbolically related to the stimulus content. This extension followed directly from Freud's model of defensive mechanisms altering the

guise of an unacceptable thought so as to allow it to appear in consciousness without creating symptomatic distress. These transformations of subliminal stimuli were believed to result from the operation of "primary" processes (i.e., the use of condensation, displacement, symbolization, reaction formation, etc.). Research conclusions such as these reinforced Freud's earlier positive appraisal of this method, and subsequent psychoanalytically oriented authors have felt it to be a powerful method of studying thought processes occurring at preconscious or unconscious levels.

Most recently, Lloyd Silverman and his associates at New York University have conducted over thirty studies using a subliminal perception paradigm they have called the "subliminal psychodynamic activation method". Silverman (1976) and Silverman and Fishel (1981) have summarized the rationale, methods, and results of this research. In its most basic form, the theory underlying these studies asserts that pathological behavior and symptomatology can be seen as the product of the opposition between specific unconscious libidinal and aggressive wishes and the defensive processes opposed to the expression in thought, perception, or behavior of these impulses. Drawing directly from the classic psychoanalytic models, the pathological symptom is understood as a "compromise" (Freud, 1940/1969) product of

this dynamic conflict.

Over the past 16 years, the laboratory method of subliminal psychodynamic activation (Silverman, 1976, 1978) has been utilized to study this hypothesis regarding the relation of psychopathology and dynamic - unconscious conflict. Using an absolute threshold paradigm, the method involves four millisecond (msec) tachistoscopic exposures of conflict related and neutral (control) verbal and pictorial stimuli under conditions in which both the experimenter and subject are blind to the stimulus content. (The subjects are often unaware of the true nature of the hypothesis under study, as well.) The effects of these exposures were typically assessed by measures of thought processes (the Rorschach, Thematic Apperception Test, and clinical interviews), feeling states (interview, questionnaire), speech disorder (interview), nonverbal bodily disorganization (observer ratings), and other study specific indicators of psychological integration. The results of over thirty studies were interpreted by Silverman (1976) as warranting the following generalization:

When a conflict-related stimulus registers subliminally, it makes contact with whatever congruent unconscious conflicts are active at the time. Then, whatever psychopathology is present, which is rooted in that conflict, will increase or decrease, the particular direction depending on whether the stimulus has conflict intensifying or conflict alleviating connotations. (p.34)

The importance of the stimuli being subliminal, for obtaining these results, has been suggested in a number of studies (e.g., Rutstein & Goldberger, 1973; Silverman & Crandall, 1970), in which the identical stimuli have failed to affect the level of pathology when presented supraliminally and subjects were consequently aware of their content.

Experiments related to this hypothesis have been conducted with depressives, homosexuals, stutterers, phobics, and schizophrenics (Silverman, 1976). Supportive evidence has most recently been reported in studies of insect phobia (Silverman, Frank, & Dachinger, 1974), obesity (Silverman, Martin, Ungaro & Mendelsohn, 1978), competitive behavior (Silverman, Ross, Adler, & Lustig, 1978), and schizophrenia (Litwack, Wiedemann, & Yager, 1979). Despite this large outpouring of research over the past two decades few replications of this work have been done outside New York University under the direct or indirect supervision of Silverman. Indeed, over 70% of these studies are conducted by doctoral candidates under Silverman's chairmanship. Rutstein and Goldberger (1973) report support for Silverman's work; however, Greenberg (1977) failed to replicate Silverman's major findings with schizophrenics. Since the former are colleagues of Silverman, the failure of the latter truly independent study by a behaviorally oriented researcher underscores

the need for independent study of this research paradigm. Finally, Silverman has used of the method as a positive adjunct to behavior modification with obese women - a successful, novel, and therapeutic use of the method (Silverman, Martin, Ungaro, & Mendelsohn, 1978). Thus, the need for replication of the major findings of this research is warranted from a clinical point of view, as well.

In an attempt to encourage replication and extension of his work, Silverman, Ross, Adler, and Lustig (1978) reported the results of four experiments using a relatively simple variant of the subliminal psychodynamic activation paradigm. The simplification involved using anormal college sample and more direct dependent measures. The intent of each of the four studies was to manipulate the degree of current oedipal conflict manifestation in normal college males, and to observe the effects of this manipulation upon competitive dart-throwing performance. The central theoretical proposition of the study was that males can inhibit or enhance competitive performance in a dart-throwing competition to the extent that the performance has the unconscious significance of defeating one's father for mother's love, i.e., the oedipal situation as classically defined (Beisser, 1961). Stimuli were choosen either to intensify or alleviate prior existing oedipal conflicts.

Therefore, each subject served as his own control in a repeated measures design. Intensifying stimuli were aimed at condemning the idea of outperforming the father, i.e., "BEATING DAD IS WRONG"; and, alleviating stimuli were designed to sanction the idea of winning over the father, i.e., "BEATING DAD IS O.K.". Each message was accompanied by a congruous line drawing. Though, in one experiment, uncontrolled lighting was said to cancel the effect, overall, the three studies were interpreted as supporting the major proposition of the experiment.

The goal of the first part of the present study is to replicate as closely as possible the major findings of the just-described study: conflict enhancing and alleviating stimuli, when presented subliminally, affect the competitive performance of normal college males. The second part of this thesis is aimed at further elucidating the psychological processes mediating the magnitude of the subliminal psychodynamic activation effect. This last variable was chosen for study in light of Silverman's recent therapeutic use of the paradigm.

Early efforts by researchers to study processes mediating the effects of subliminal stimuli were aimed at increasing the "recovery", or identification, of the

subliminally presented stimulus. Paul (1964) found that a drug-induced (LSD-25) alteration in consciousness was effective in promoting the recall of experimenter supplied "themes". Stross and Shevrin (1968) found a definite facilitation of recovery in revery and hypnotic states. Most recently, Sackeim, Packer, and Gur (1977) studied the effects of a cognitive set (analytic vs. intuitive) and a cognitive trait (hemisphericity¹) on stimulus recovery and found an interaction: i.e., trait right-eye deflection (subject's perspective) in response to a question-type and the organized condition facilitated recall for trait right-eye deflection persons, the converse was true for left-deflection trait subjects whose recall was facilitated by the intuitive condition. It appears that psychological processes underlying personality characteristics and psychological state variables are important mediators of the effect of subliminal stimuli.

In the second part of this thesis, a cognitive trait and a cognitive-affective state variable will be manipulated in an effort to effect the magnitude of the

¹Hemisphericity refers to the habitual use of either hemisphere, as a preferred information-processing mode (cf. Ornstein, 1972). The hemispheres are believed to differ in their ability to process different kinds of information. This difference corresponds with the cognitive state distinction mentioned above.

subliminal psychodynamic activation effect upon ongoing competitive behavior. The experiment by Sackeim, Packer, and Gur (1977) provides the immediate context for this portion of the thesis. However, the manipulation of the cognitive trait - the tendency to use imagery or verbal codes in problem solving - will be effected by use of the Visualizer-Verbalizer Scale (VVQ) questionnaire recently developed by Richardson (1977), and not by the use of eye movements as in the original study. Difficulties have been reported in the reliability of the eye deflection measure of hemisphericity (Pope & Singer, 1978). This will provide a more satisfactory measure of hemisphericity. Similarly, the cognitive state variable will be effected by the use of a task induction procedure. This series of task instructions is designed in light of work done in hypnosis, studies of imagery induction, and the role of interpersonal demand characteristics facilitative of compliance. Finally, a self-report measure of ability to comply with the task will be used as a means of assessing the subject's actual achievement of the state, a variable not controlled in the Sackeim et al., study. With this design, it is hoped that psychological variables effecting the magnitude of the subliminal psychodynamic effect will be elucidated. This data will be germane to subsequent efforts to use the technique as a therapeutic modality. Finally, it will

provide a partial replication of Sackeim, Packer, and Gur (1977), and establish the robustness of their interaction effect.

Chapter II

Review of Pertinent Literature

Introduction

Several comprehensive and scholarly reviews of the voluminous literature on subliminal perception research are in print (e.g., Dixon, 1971; Wolitzky & Wachtel, 1973; Klein, 1970; Fisher, 1957, 1959; Smith & Westerlundh, 1980). Therefore, the present review selectively covers those aspects of the literature necessary to achieve a working understanding of the theoretical and methodological framework of the present report. The interested reader seeking a broader canvassing of the issues is referred to Dixon (1971) for a comprehensive review of the different types of effects investigators have claimed for the subliminal paradigm. Wolitzky and Wachtel (1973) offer a sound examination of the literature in the personality-perception interface research. And Klein (1970) presents his own integration of psychoanalytic theory, subliminal perception research, and the related literature on "cognitive controls". The following draws freely from these more exhaustive efforts.

Subliminal perception research emerged as a specialization among a body of diverse research efforts united most basically by the idea that what a man perceives may depend as much upon who he is or what he is

feeling as upon what is objectively present in the environment. According to this functional view of perception, man learns not only to modify his overt behavior, his muscular movements or verbal comments, he learns also to modify his looking and hearing so as to be able to notice what he needs to notice in order to survive, or sometimes to avoid noticing what it hurts to notice, even at the price of survival. Within the functional perspective, Wolitzky and Wachtel (1973) have identified three main lines of research on subliminal perception. One line of research draws upon psychophysics, more specifically signal-detection theory and its accompanying methodology, to determine the information-processing limits of the perceptual apparatus. For example, Bevan (1964) studied the effects of subliminal anchors upon psychophysical judgements. A second line, examining verbal conditioning without awareness, has focused largely on establishing experimental analogies of therapeutically effective learning (e.g., Greenspoon, 1955; Verplanck, 1962).

It is the third line, reflecting an interest in perception and personality (Klein, 1970), and often called the "New Look" in perception (Erdelyi, 1974) which is most directly related to the current research. This research was guided by the theoretical framework of dynamic psychology and experimentally studied the thinking

processes described by Freud. Before considering examples of this research, it will clarify subsequent discussions first to review the techniques, criteria of awareness, and response indicators used in these studies.

Techniques of Subliminal Perception

Three main methods have been used to present stimuli without subject's awareness.

1. Incidental Stimulation. An above threshold stimulus is presented, but the subject's attention is diverted from it by a separate focal task (Bach, 1960; Pine, 1960, 1961). This has been the least frequently used method, despite its "naturalistic" quality, since it is impossible to distinguish the incidental nature of the stimulus from recall or memory phenomena.

2. Backward Masking. Developed by Werner (1935), and referred to as the A - B technique (Klein et al., 1958; Eagle, 1959; or the metacontrast techniques by others), this technique involves the tachitoscopic exposure of one stimulus, A, immediately followed by exposure of a second stimulus, B. A is presented long enough for full identification but B is superimposed upon this temporal duration of A so that the latter is perceptually masked. B is clearly supraliminal. The influence of A is sought in S's response to B.

3. Impoverished Direct Stimulation. One stimulus is

exposed tachistoscopically very briefly, one or more times, and its influence is sought on a subsequent task (e.g., Spence & Holland, 1962). This is the most frequently used method.

In methods 2 and 3, independent threshold determinations are made, usually after the experiment proper, using the exposure level at which the critical stimuli were exposed. A subliminal effect is claimed if there is a discrepancy between response indicators; i.e., no awareness as measured by verbal report and discrimination or detection thresholds, but an effect inferred from a detectable influence on some other response. The specific criteria of subliminality vary from one study to another and are described in the next section.

Criteria of Awareness and Unawareness

Hilgard (1962) has presented a descriptive categorization of subliminal stimuli, summarized below as adapted by Wolitzky and Wachtel (1973).

1. The stimulus is below the level of registration. The input is so minimal that there is no physiological effect.

2. Above the level of registration, but below the level of detection. In this range the subject cannot discriminate between the stimulus and a blank field. In

the event of negative results, it is impossible to say that the stimulus has, in fact, been registered.

3. Above the detection level, but below the level of stimulus discrimination. It is often possible for a stimulus to be reliably discriminated from a blank field, but not from another stimulus (Wolitzky, 1961).

4. Above detection and discrimination level, but below the level of identification. In this range, the subject can achieve a "something - or - nothing" and a "something - something" discrimination, but the partial clues are not enough for him to make a correct identification of the stimulus.

5. Below the identification level only because of a defensive reaction. This refers to a raised recognition threshold in the perceptual-defense kind of experiment.

While these criteria of subliminality are presented in terms of the threshold measures used, levels 1-4 should probably be considered as on a continuum of information input, with eventual recognition reflecting a qualitative change in perceptual experience because of the introduction of meaning.

The preceding delineation of "techniques" of stimulation, and of "criteria" of awareness-unawareness, are of critical importance in working through the controversies in this general area of research. Much of the literature abounds in unnecessary squabbling over

purely definitional and quasi-logical issues (e.g., Schwartz & Shagass, 1961). Attention to these essentially methodological differences between studies should result in greater sophistication in isolating subliminal phenomena and the processes underlying them.

Demonstrations of Subliminal Influences Upon Behavior.

Poetzl's (1917/1960) previously cited study of the role of the incidental stimulation of the day (i.e., the day residue) in dream content formation was the first truly empirical study in the area of subliminal perception. Poetzl exposed pictures of landscapes tachistoscopically (approximately 1/100 second) and asked subjects to draw and describe what they saw. They were asked to return the following day and to report any dreams they had had in the interim. Parts of the stimulus that had gone unnoticed following the tachistoscopic exposure frequently appeared in the manifest content of the subjects dreams. Confirmatory findings were reported by Malamud and Linder (1931) and by Allers and Teler (1924/1960), who used a free association and imagery task to assess recovery.

A revival of interest in what has come to be called the "Poetzl phenomena" was sparked by Fisher's (Fisher & Paul, 1959; Paul & Fisher, 1959) research. Beginning with an essentially intuitive approach which involved ad hoc

data analysis (Fisher, 1954), and becoming increasingly rigorous in matters of threshold measurement, scoring criteria, and statistical analysis, Fisher's work suggested subliminal stimuli can influence the content of both dreams and images. Other investigators reported supporting evidence (Luborsky & Shevrin, 1956; Shevrin & Luborsky, 1958). Johnson and Eriksen (1961), however, failed to replicate the effect.

Eriksen (1960) argued that the issue of the base rates for appearance of ideas in fantasy had been neglected, and suggested that an artificial subliminal effect could occur if one perceived element in a cohesive picture led to related associations. Moreover, the subjects might not report items they were unsure of in intentional recall, but such content might emerge during imagery when subjects employ more relaxed criteria. Johnson and Eriksen (1961) replicated the Shevrin and Luborsky (1958) study and controlled for base-rate production of stimulus related ideas; no subliminal effect was found.

In a carefully controlled study which seems to have met Eriksen's (1960) criticisms, Haber and Erdelyi (1967) obtained positive findings. The experimental group received a brief exposure of a relatively unfamiliar, complex, cohesive picture. After describing and drawing what they saw, they were asked to free associate, keeping

the picture in mind. The first twelve words elicited were each used as stimuli for ten further associations. After this procedure, subjects were again asked to draw and describe the initial picture. Two control groups were used: a "dart-control" group threw darts instead of free-associating; a "yoked-control" group never saw the original stimulus, but redrew the initial drawing of an experimental subjects before associating and then did another drawing; description-comparisons of the first and second drawings revealed that only the first experimental group showed a significant recovery of initially unreported stimulus elements. Thus, the free-associations had a facilitative or priming effect on recovery.

The influence of subliminal stimuli has been demonstrated on a variety of other behaviors in addition to dreams, images, and word associations: trait attributions (Klein, Spence, Hort, & Gourevitch, 1958; Eagle, 1959; Smith, Spence & Klein, 1959), drawings (Klein et al., 1958), guessing (Spence, 1961), reaction time (Spence & Bressler, 1962), problem-solving (Kolars, 1957), visual illusions (Smith & Henriksson, 1955), bias in intentional recall (Spence & Holland, 1962; Spence, 1964), TAT-like stories (Pine, 1960, 1961), Rorschach content (Silverman & Silverman, 1964), and formal aspects of

thought (Silverman, 1967).²

The studies cited above provide examples of influences of a subliminal stimulus upon the content of subsequent cognitions. Such measurable influences have been referred to primarily as stimulus "recovery" (or activation, or emergence) phenomena (Hilgard, 1962). These studies, as well as Silverman's (1967) on subliminal influences on ego functioning, have as an important feature in common the fact that the subject is not asked to make an intentional, direct, response to the subliminal stimulus, of which he is unaware. He is, therefore, also unaware of its influence on a subsequent task. This aspect of the procedure is often cited as closely paralleling the naturalistic influence of a preconscious or unconscious idea (Pine, 1964) on subsequent behavior.

Problematic Issues in Subliminal Research

There are three characteristic responses to subliminal perception research by interested psychologists. During the early stages of this general paradigm there were predictably those quite excited by the potential usefulness of the method (e.g., Klein, 1970; and Silverman, 1976, offer summaries). And, of course, those

²This is not intended to be a complete catalog, only an illustration of the many dependent variables used.

who seriously questioned the validity of subliminal effects, on a variety of grounds (e.g., Eriksen, 1960; Goldiamond, 1958; Weiner & Schiller, 1960). Finally, and most recently, there are those who find subliminal effects to be non-problematic, indeed quite expected (e.g., Erdelyi, 1974), within the general information-processing model of cognition. In this section, attention will be focused on the second group, with discussion of the first and third deferred to later sections of this report.

Within the group of dissenters, the major controversies have been concerned with whether cognition is influenced by stimuli truly outside awareness, and whether a "pre-perceiver" is being posited. Discussion of these issues is facilitated by the distinction made by Weiner and Schiller (1960) between a "two-process" versus a "one-process" view of perception. Briefly, the two-process view holds that a critical stimulus not perceived via the supraliminal process (consciously) may be perceived via the subliminal process (not consciously). The subliminal process may then set off the appropriate need-related or defense-related processes.

The one-process view posits a single perceptual process to account for the phenomena of subliminal perception studies as well as for perceptual process in general. In this theory, the process is described as a monotonic relationship between stimulus intensity or

duration and response strength (generally discriminative accuracy). This implies a response is essentially the same anywhere along the stimulus-intensity continuum. Though it may be impoverished as a result of low-level input. Thus, awareness is conceived of in terms of degrees. And, it is argued, in purported demonstrations of subliminal effects, refined threshold procedures will reveal the presence of partial cues, or indicate the subject was potentially aware of the stimulus input. Eriksen (1960) and Goldiamond (1958) have been the strongest proponents of "partial cues" in accounting for subliminal effects. Since the subliminal effects achieved in most studies are weak, elusive, and subtle, arguments such as this have flourished.

The two-process view is somewhat differently stated by Klein (1959a,1959b) who referred to registration without awareness as usually defined rather than perception without awareness. Klein's choice of terminology reflected his recognition that the term "subliminal perception" constitutes a misnomer, since he includes in his definition of perception awareness of the meaning or identity of a stimulus. Klein is not positing two perceptual processes; rather, the distinction between registration and perception recognizes that a stimulus which is not discriminated perceptually can nonetheless influence other modes of experience, such as imagery. The

use of the more conservative term "marginal stimuli", by Klein, suggests that the issue of partial cues is irrelevant, except for a theory of perception, per se (Klein, 1959a, 1959b; Klein & Holt, 1960).³

The preceding review highlights the fact that much of the controversy in subliminal perception research, and in the related area of perceptual defense, stems from differing theoretical and experimental preferences among various researchers. This leads to different definitions of "subliminal perception" and "awareness", as well as to different experimental methods which, in theory, make it difficult to compare studies using different threshold procedures.

In light of Klein's (1970) aims and theoretical perspectives, these controversies over methodological

³Though several studies have responded to the criticisms of Goldiamond (1958) and Eriksen (1960) and employed more refined threshold procedures (e.g., Guthrie & Weiner, 1966; Silverman & Spiro, 1967) the debate was never truly settled. Since the threshold is a statistical concept, it is impossible to prove that partial cues are not present. And, there is neuropsychological evidence that registration can occur without awareness (Dixon, 1971, Wolitzky & Wachtel, 1973, p. 834). Finally, since Sperry's (1969) arguments are persuasive regarding the role of conscious experience effecting subsequent brain processes, it is perhaps most feasible to reconcile the issue along the lines set out by Klein. In other words, researchers interested in the role of "marginal" stimuli can continue their efforts in light of the greater methodological sophistication which comes from recognizing the need to control for the effects of "partial cues" in the perceptual process, per se. This view is shared by Dixon (1971).

issues have deflected subliminal research from a potentially valuable direction (cf. Wolitzky & Wachtel, 1973). The programmatic interest of Klein's work was the interaction of central and peripheral trains of thought. For Klein, it is more important to ask to what degree must a stimulus be recognized as to identify and meaning before it produces a qualitative change in behavior, than to ask the converse, how impoverished must a stimulus be in intensity before it no longer effects behavior. The latter question leads to a preoccupation with sensory thresholds and often to ESP (Wolitzky & Wachtel, 1973); the former raises essentially the same issues as do studies of incidental learning. For example, under what conditions will peripheral ideation intrude upon or become incorporated into conscious, intentional thinking? How does intentional, reality-oriented thinking persist in the face of ideational systems that are active but irrelevant to a person's executive intentions (Klein, 1970)? This perspective was intended to guide research on two related major issues: a.) the functional importance of awareness, and b.) the specification of conditions which determine behavioral effects of peripherally aroused trains of thought. The method to answer these questions involves comparing effects of 'incidental' stimuli (related to the peripheral arousal of an intention) with those of focal stimuli (related to the dominant train of intentional

thought).

In this framework, subliminal stimulation was intended to be only a methodological entry into the problem, a means of achieving "incidentally" of stimulation under experimental situations. Insofar as the liveliness of the debate surrounding subliminal stimulation paradigms often obfuscated more central theoretical issues of the kind raised by Klein, the choice of this methodology was unfortunate. While this method does permit control over stimulus input, it is a sad truth that the larger and more important context of "subliminality", i.e., the differential effects of peripheral versus focal awareness of stimuli (and thoughts), was lost.

However, since the methods used in both the Poetzl-type studies and in more recent studies involve the tachistoscopic presentation of impoverished, low-level stimuli, the studies will be discussed in terms of "subliminal" and "supraliminal" influences on behavior.

Subliminal versus Supraliminal Influences on Behavior

Examination of studies which make subliminal-supraliminal comparisons does not produce a definitive answer to the question of whether such stimuli lead to different degrees and kinds of influence. Poetzl's (1917/1960) earlier cited finding that conscious percepts

are less likely to appear in dreams than are "unperceived" stimuli is reflected both by everyday observation and empirical study (e.g., Shevrin & Luborsky, 1958).

Fisher's (1959) study, however, is a good example of the difficulty of drawing any general conclusion that does not require extensive qualification. In this report, Fisher suggests the likelihood and manner of incorporation of "day residues" into the dream is a complex interaction of awareness versus non-awareness of the stimuli, the ideographic meaning of the stimulus for the subject, and the subject's conflicts and defenses. Similarly, Spence and Holland (1962) reported a subliminal stimulus ("cheese") produced a greater bias in recall than a blank or a supraliminal exposure. Subsequently, however, Spence and Ehrenberg (1964) reported that food deprivation, as assessed by subjects report before the experiment, produced a preferential recall effect, whether or not the stimulus was supraliminal or subliminal.

With regard to the range of subliminal effects, Pine (1964) introduced the distinction between "direct" and "indirect" effects of stimuli. Direct effects are those having a relatively close or direct logical, semantic, or figural relation to the original stimuli. For example, Zuckerman (1960) found subliminal presentation of the messages "write more" or "don't write" resulted in significantly longer or shorter TAT stories. Supraliminal

presentations of these messages produced no consistent group differences in story lengths. Smith, Spence and Klein (1959) presented either the word "happy" or "angry" masked by a supraliminal picture of a face that was affectively neutral. The stimulus words biased responses towards more positive or negative descriptions of the face, though the words themselves were rarely used in descriptions. Instead, common associates and words logically related to the stimulus words were often used, while remote symbolic associates were not.

Indirect effects are those not obviously related to the initial stimulus. They include symbolic transformations of the initial stimulus and Pine conceives of them as results of primary process thinking. Pine (1960) showed that subjects exposed to a focal description and a concurrent incidental description of two different symbolic objects (a hook and a cow) incorporated themes from both descriptions into TAT responses given subsequently. However, the focal and incidental themes were incorporated directly or more distortedly in line with his predictions concerning the effects of focality.

Many other studies have investigated subject variables and stimulus conditions which facilitate or inhibit subliminal effects. These studies are reviewed extensively in the applicable sections of the reviews by Klein (1970), Dixon (1971), and Wolitzky and Wachtel

(1973). The latter concludes that subliminal effects are facilitated when subjects are in a low state of arousal, attention is unselective or broadened, and cognitions are intuitive, global, symbolic, and unbound by logical constraints. These conclusions have recently been qualified by Sackheim, Packer, and Gur's (1977) report of an interaction between hemisphericity, a cognitive trait, and induced cognitive "set" or "state" ("intuitive" or "analytic") on subliminal effects.

Several models have been advanced to account for these results (Klein, 1970; Dixon, 1971). The most representative is the "schema activation" model proposed by Klein and Holt (1960) and further developed by Klein (1970). They define a schema as an organized group of memory traces, including both conceptual associates and drive-related derivatives. They further assume every perceptual process includes scanning of memory schemata so incoming stimuli can be recognized and take on meaning. Finally, schemas may be activated by: a) sets or anticipations, b) the scanning process that selects traces which match incoming stimuli, and c) connections to drives. The results of subliminal and incidental stimulations, are interpreted by the author, as due to the activation of stimuli relevant schemas which leads to behavioral effects even when the activating stimuli are not consciously detected or experienced. The authors also

argue that stimuli contacting an active drive schema are differentially advantaged for recovery. They suggest that in masking studies, the first, or A-stimulus, will activate certain schemas. If these are relevant to some ambiguous property of the second, or B-stimulus, reactions to the second stimulus will be biased. Klein (1970) later pointed out that the schema activated by A can influence B because it does not receive the goal-directed processing afforded the B stimulus. Stimuli, when consciously identified and processed by a subject, is much more likely to be subjected to inhibitory processes filtering out all but the most relevant associative linkages pertaining to the goal most pertinent to the subject at the time. The A-stimulus is less exposed to this selection process, and its effects are increased if it is drive-relevant. Thus, the elements comprising the schema activated by the A-stimulus can become more available to recall under conditions of drive-relevancy.

The foregoing is part of a more elaborate theoretical model (Klein, 1970) which assumes that, in addition to conscious concerns and focal intentions, there are concurrent trains of thought in a state of activation (by drives) that also make claims on response channels. Insofar as subliminal or incidental stimulation can be considered to activate these peripheral trains of thought,

the method offers a way to study their emergence in various response channels.

Silverman's "Subliminal Psychodynamic Activation" Paradigm

As part of a coordinated research effort aimed at clarifying and validating the basic psychoanalytic theory of conflict and defense, Silverman and his colleagues at New York University have published over 30 studies (Silverman, 1976; and Silverman & Fishel, 1981) using a laboratory technique termed "subliminal psychodynamic activation". The basic theory underlying this effort is Freud's model of unconscious conflict and defense as causes of psychopathological symptomatology. Silverman (1976), consistent with Freud's model, assumes a stimulus containing wish-related material makes contact with "derivatives" of the wish if the wish is currently active. Therefore, the subliminal input produces an effect analagous to that of an internally generated increase in the intensity of an unconscious wish. In line with Pine's (1964) distinction, discussed earlier, regarding focality-incidentalality, and the psychodynamic theory of defenses, Silverman argues ideas and images activated by this input are likely to be transformed so that their wish-related nature is obscured. Silverman would predict on the basis of these models that subliminal stimuli would not directly enter awareness but rather

emerge indirectly without the person's awareness, into elements of ongoing behavior. Silverman suggests evidence for this prediction can be obtained by increases or decreases in pathological symptoms related to the unconscious wish. The direction of effects will depend upon whether the stimulus has conflict intensifying or conflict alleviating connotations.

This model of the effects of subliminal stimulation is closely related to the model developed by Klein (1970) discussed earlier. However, while Klein's efforts were directed at refining the theory underlying his model, bringing it into closer and more precise relations with empirically generated data, Silverman's efforts have been in another direction. This direction was outlined in Silverman's (1975) article. Here, Silverman explicitly accepted the general validity of this psychoanalytically derived model and endeavored to interest his non-experimental colleagues in the usefulness of his paradigm for testing hypothesis concerning the role of specific wishes in various pathological states. To quote Silverman: "...when a particular causal relationship is suggested in the clinical situation, its investigation in the laboratory can allow for ruling out of other cause-effect sequences" (1975, p. 61). Two of the specific "relationships" referred to, and discussed in detail in this paper are : a) the role of conflict over

aggressive wishes, and b) the role of symbiotic wishes, in producing the clinically observable symptomatology of schizophrenia. Thus, Silverman's efforts over the past two decades have been directed at validating psychoanalytic propositions relating specific symptom-complexes (e.g., schizophrenia, depression, homosexuality) to particular unconscious conflicts (e.g., aggression towards others and symbiotic needs for mother; aggression towards self; and symbiotic needs toward both parents; respectively).

It is useful to present Silverman's basic paradigm before discussing some characteristic studies he has performed. Most basically, the effect on symptomatic behavior of subliminally presented wish-related stimuli is compared to that of subliminal presentation of relatively⁴ neutral stimuli. Sessions usually begin with a "baseline" assessment of the subjects propensity for whatever behavior is being studied. This is followed by 4-msec tachistoscopic exposures to conflict-related or neutral stimuli. Both pictorial and verbal stimuli are shown several times (usually four) for each condition; and, both the experimenter and subject are blind to the

⁴Silverman (1976) argues the qualification, "relative", is necessary since the particular relatedness of stimuli to wishes is largely ideographically determined and often difficult to precisely identify. Hence, what is "neutral" for the experimenter may not be for the subject.

stimulus content. A re-assessment of the pathological behavior follows the tachistoscopic presentations. This procedure is repeated for other neutral and critical stimuli in the same session or the next day(s). Silverman (1976) reports predicted results for a variety behaviors including thought processes, feeling states, speech manifestations, non-verbal behavior and sexual attraction.

The majority of the earlier studies in this program were directed towards investigating the role of aggressive wishes and symbiotic merging fantasies in schizophrenic symptomatology (Silverman, 1975). A variety of aggressive and neutral pictorial stimuli were used, e.g., a lion charging versus a bird flying, a man holding a dagger versus a man reading a newspaper, and the verbal stimuli CANNIBAL EATS PERSON versus PEOPLE ARE WALKING.

Generally, the aggressive stimuli leads to increases in pathological behavior measured by Rorschach content, TAT stories, word associations, and a 6-point scale measuring "non-verbal pathological behavior" (e.g., loud "inappropriate" laughter). As this series of studies progressed various qualifications regarding the robustness of the effects were hypothesized to account for study-specific inconsistencies in the results obtained. For example, Silverman (1971) suggests the effects are often delayed, and that effects were more reliable with long-term rather than short-term schizophrenics (Silverman

& Crandall, 1970).

Later investigations (Silverman, Spiro, Weisberg & Candell, 1969) present evidence suggesting subliminal input of the message MOMMY AND I ARE ONE (a "symbiotic-gratification fantasy") produces decreases in symptomatic behavior among "differentiated" but not "undifferentiated" schizophrenics. Silverman (1974) argues these ameliorative effects are specific to this message since several related but distinct messages (e.g., MOMMY IS ALWAYS WITH ME) had no effect on symptomatic behavior. Silverman (1977) concludes that symbiotic gratification messages can decrease conflict and therefore symptoms in differentiated schizophrenics, while the activation of aggressive fantasies, which increase conflict, leads to the intensification of symptomatic expressions.

An independent series of studies have investigated psychoanalytic propositions relating a different set of stimulus contents to depression, homosexuality, stuttering and competition. Rutstein and Holdberger (1973) argue presentation of aggressive stimuli leads to higher self-ratings of depression but to no change in Rorschach measures of aggression against the self in neurotically depressed patients. Consistent with the psychoanalytic hypothesis that homosexuality involves (in part) a flight from incest, Silverman, Krawer, Wolitzky, and Coron (1973)

found stimuli containing incestuous themes produced an increase in homosexual and a decrease in heterosexual feelings reported by a group of homosexual males. In a later study, Silverman, Klinger, Lustbader, Farrel, and Martin (1972), stuttering was found to increase after subliminal presentations of "anal content", as compared to neutral content. Most recently, Silverman, Ross, Adler, and Lustig (1978) report competitive behavior (dart-throwing) was differentially effected by oedipally-related stimuli either condoning or condemning the idea of defeating father. Silverman (1975, 1976, 1977) finds these studies conclusive in supporting specific psychoanalytic propositions regarding the role of different unconscious wishes and fantasies in various forms of pathology.

A later refinement of Silverman's methodology occurred when it was noted that the stimuli used in previous studies were uniformly negative in their affective connotations. Therefore, Silverman, Bronstein, and Mendelsohn (1976) tested new groups of stutterers, homosexuals, depressives and schizophrenics with the following protocol. Each subject was subliminally exposed to three sets of stimuli: a) the "relevant" wish-related stimulus (aggressive for depressives and schizophrenics, incest for the homosexuals and anal for the stutterers); b) an "irrelevant" wish-related stimulus, i.e., one

intensifying the pathology of one of the other groups (e.g. depressives might receive an incest message) but not the specific group in question; and c) a neutral control stimulus. Three of the four groups showed significant increases in pathology after exposure to their "relevant" wish-related stimulus (the depressive group showed mixed results). In no reported instance did the "irrelevant" wish-related stimulus alter the pathology in question. These results were interpreted as evidence for the specificity of unconscious wishes in various forms of pathology, i.e., that symptoms have specific psychodynamic, conflictual meanings and express an individual's struggle with a particular conflictual wish.

More recent studies with the MOMMY AND I ARE ONE stimulus have suggested it can enhance the therapeutic efficacy of various treatment modalities with obese women (Silverman, Martin, Ungaro & Mendelsohn, 1978), and with insect phobics (Silverman, Frank & Dachinger, 1974). Silverman (in press) reports unpublished dissertation findings suggesting repeated exposures to this stimulus compared to a neutral one resulted in higher exam scores for a group of college students. The repeated success Silverman has achieved with symbiotic and oedipal stimuli in his studies has led him recently to develop a general thesis with regard to their role in therapy (Silverman, 1978a, in press). Specifically, he argues the

gratification or frustrated intensification of unconscious fantasies plays a central role in most contemporary therapies. He suggests certain therapies (e.g., systematic desensitization, client-centered therapy, and meditation) are likely to activate symbiotic-gratification fantasies

in which the therapist is unconsciously perceived as the good symbiotic mother. Other therapies (e.g., behavioral sex therapy, body-contact therapies, assertiveness training, and encounter treatments) are more likely to activate fantasies of sanctioned oedipal gratification in which the therapist is unconsciously experienced as a gratifying superego figure. Within the context of his empirical success with these two dynamic themes, Silverman argues their inadvertent activation may play a significant therapeutic role in treatment successes.

This brief overview of Silverman's research program highlights several distinctive features of his "subliminal psychodynamic activation paradigm". It is one of the most prolific ongoing programs of research to emerge from the "New Look", personality and perception integration begun in the 1950's. With more than 30 published (and over 30 unpublished; Silverman, personal communication) studies completed it clearly evidences the ongoing impact of psychoanalytic theory upon experimental research. With Silverman's recent excursion into the muddled waters of

treatment efficacy research it promises to enliven debate regarding the continued viability of psychoanalytic theory in this day of briefer therapies" (Silverman, 1976, "Psychoanalytic Theory: "The reports of my death are greatly exaggerated.""). Further, with the untimely death of George S. Klein, perhaps the most scholarly integrator of psychoanalytic theory and basic psychological research, Silverman's efforts are of singular promise for clinicians envisioning a "clinical-experimental psychology of unconscious phenomena" (Wolitzky & Wachtel, 1973, p. 840).

It is clear from the extensiveness of purportedly positive experimental finds, and the broad generalizations starting to emerge from Silverman's efforts, that there exists a need for careful evaluation and independent replication of this work. Therefore, a few general criticisms directed at the robustness and construct validity of the general paradigm are introduced below. With these in mind, the nature of the current writer's research is described.

In tracing the sequence of individual reports emerging from Silverman's laboratory it rapidly becomes apparent that the confidence Silverman expresses in his research (e.g., Silverman, 1976) is rarely based on unequivocal and repeatedly obtained findings. For example, follow-up studies on the role of aggressive fantasies in schizophrenics reported inconsistent results

which were explained away by elevating the obtained discrepancy to the status of a discovery. Thus, the failure to record an immediate effect of the subliminal stimulus was argued to be the result of a "delayed effect" which would have been recorded if assessment had continued⁵. Similarly, a later failure to find consistent results with schizophrenic groups was "resolved" by an ad hoc separation of subjects within the experimental group into "differentiated" and "non-differentiated" subjects. Greenberg (1977) also notes the lack of consistency in effect across studies and complains that Silverman shifted too quickly from one dependent measure to another without exploring in any detail the various strengths and weaknesses of the measures. In a similar view, Shapiro (1978) points out that studies of symbiotic stimuli with schizophrenics have produced inconsistent results in that significance tends to occur on one or another measure but rarely on all measures used in a study. Moreover, the effects appear on different measures from study to study. Shapiro correctly observes this does little to encourage a sense of

5. Silverman (personal communication) has recently suggested that the effects of the subliminal stimuli are of relatively brief duration. Though these two statements are inconsistent, Silverman apparently feels their selective use in accounting for unexpected results is not unacceptable.

confidence in the purported causes for the effects. Silverman (1978a) replies to this criticism by arguing there was a common effect in these studies; i.e., the measures were all of "adaption" and therefore the fact that this general process manifested itself in different ways across the different individuals and studies does little to challenge the basic thesis. Silverman also suggests this differential expression of the "adaption-enhancing" stimuli warrants further research. While undoubtedly correct in his prescription for the future, the explanation he offers for the consistency is not compelling. Silverman has not presented data suggesting the variety of dependent measures he utilizes do indeed measure "adaption", nor does he present evidence that such a construct has validity in itself. Since he has not addressed these issues, it is necessary to accept on faith Silverman's rejoinder to Shapiro. In effect, his explanation of the results as being consistent with a general effect of "greater adaptive functioning" ignores the direct challenge to the robustness of his efforts.

It is also not uncommon to find Silverman engaging in ad hoc identification of uncontrolled personality variables as critical in attenuation or differentially effecting his results (e.g., the "deniers" in Silverman, Bronstein, & Mendelsohn's, 1976 sample of depressives). Though personality variables may indeed be important

intervening variables in the subliminal psychodynamic effect there is little justification for positing their role after the conclusion of an experiment to account for inconsistent results. What is at issue is the nature of the subliminal causative agent and this is the question that truly needs to be addressed. Hypothesizing intervening variables at this stage of the research paradigm is very likely premature.

One obvious independent variable of the "subliminal psychodynamic activation paradigm" has received surprisingly little attention. Dixon (1971) argues subliminal effects occur within a very small range of stimulus values. Except for a recent report (Silverman, Ross, Adler, & Lustig, 1978) Silverman has not reported the illumination levels for either the stimulus or blank fields used in his experiments. Since the sensory channel used in this paradigm is visual it is curious that sensory adaption times for the tachistoscopic fields and room illumination levels have not been reported until the 1978 study. And finally, details on the construction, brightness and contrast of stimulus cards are usually absent. The absence of this data suggests Silverman has failed to consider the question of the stimulus range for the subliminal effect. It must also be noted that failure to determine these values makes exact replication of his studies difficult, if not impossible.

Another variable of Silverman's paradigm has received similarly cavalier treatment, i.e. stimulus duration. Except for the footnote in Silverman and Spiro (1967, p.329) referring to an earlier study (Silverman, 1965) in which no differences were observed between 4 msec and 6 msec stimulus exposures, Silverman has not discussed this aspect of his methodology. Readers are left without a rationale, either theoretical or empirical, for the choice of 4 msec exposure speeds, durations between exposures (usually 3 seconds) or number of exposures used (usually four). It is important to note systematic variation of these parameters could contribute to understanding the range of stimulus values underlying subliminal effects. A final parameter rarely reported in this paradigm is subject threshold data. Silverman, Ross, Adler, and Lustig (1978) do report threshold data but not the method of obtaining it. As Eriksen (1960) has noted, differing threshold determination methods lead to different threshold estimates. Silverman's data is not sufficient then to determine how far below detection and discrimination level one can go and still observe a subliminal effect.

Silverman and his colleagues have addressed the competing hypotheses that "partial cues" were available to some subjects during his studies and that these cues influenced behavior in the direction of an "experimenter

demand" effect. Silverman and Spiro (1969) and Silverman (1968) completed two studies which offer data inconsistent with the partial cue hypothesis of subliminal effects. They reported subjects were unable to discriminate (without having to identify) between neutral and critical stimuli when presented under conditions used in previous experiments. While these studies are noteworthy, the discrimination task used has not been administered to subjects in all studies (e.g., Silverman, Frank, & Dachinger, 1974). Silverman (1976) later addressed this same question and suggested Rutstein and Goldberger's (1973) report makes the hypothesis of partial cues particularly unlikely as a viable alternative explanation. In this series of seven studies, stimuli were presented at both 4 msec and 10 second durations, and in none did supraliminal exposures lead to significant changes in measured pathology, while all obtained predicted subliminal effects. While these studies are useful insofar as they suggest supraliminal exposures of "critical" stimuli lead to no effects, they do not rule out the role of partial cues (Weiner & Kleespies, 1968). Swanson (1979) has presented the following "overstated example". It is easy to imagine subjects reactions to the part-cue "HI" might differ very much from those to the complete word "SHIT". Therefore, a direct test of the partial cue hypothesis cannot be achieved with

supraliminal stimuli but must instead use a design where partial cues are more directly made available to subjects.

At least one or more of the foregoing criticisms apply to each of the studies conducted within Silverman's paradigm. This suggests the efficacy and reliability of the paradigm and of the generalizations emerging from it are still in doubt. Similarly, Silverman's faith in the psychoanalytic model of pathology must also be questioned by independent researchers despite the publication of several experiments purporting to assess the "specificity of content" hypothesis (i.e., Silverman, Bronstein, & Mendelsohn, 1976).

In light of these questions about the reliability of the overall findings and validity of "subliminal psychodynamic activation" construct hypothesized to underlie the results, the need for independent replication of specific features of the paradigm is clearly indicated. Silverman (personal communication) lists 19 studies completed by independent researchers not under his sponsorship. Only three of these have been published. Rutstein and Goldberger's (1973) study was completed while Rutstein was a graduate student at New York University and obtained inconsistent results. The other published articles (Greenberg, 1977; Emmelkamp & Straatman, 1976) appear in European journals and report failures to replicate. Greenberg's (1976) study compared the effects

of aggressive and neutral stimuli upon schizophrenics. The only significant finding reported was of the intensification of "disturbed thinking" following exposure to a neutral stimulus, inconsistent with Silverman's own published effects. Emmelkamp and Straatman (1976) found no subliminal effect with a symbiotic gratification stimulus on snake phobics in an attempted replication of Silverman, Frank, and Dachinger (1974). Unfortunately, it should be noted that these reports are characterized by many of the same methodological flaws discussed with regard to the original studies.

The Present Study

In an explicit effort to encourage replication, and to demonstrate subliminal effects on a type of behavior not previously studied, Silverman, Ross, Adler, and Lustig (1978) report results of four experiments with college males as subjects. In addition to using a non-clinical population this study used a far simpler dependent measure than had previous studies. In a similar vein, the intention of each study was to manipulate subliminally the degree of oedipal conflict in "normal" subjects and to determine the results of this on their accuracy in a dart-throwing competition. Bi-directional experimental effects were sought through the use of conflict enhancing

and alleviating stimuli which either sanctioned or condemned the idea of defeating father in competition. The verbal messages were: BEATING DAD IS OK, and BEATING DAD IS WRONG. Each message followed a congruous line drawing of an older and a younger male either both smiling (sanction condition) or both frowning (condemn condition). Thus, the study is an attempt to test the psychoanalytic proposition that males can unconsciously inhibit themselves in competition performance because winning has the hidden connotation of defeating father for mother's love (Beisser, 1960).

Three of the four experiments reported in this study obtained results consistent with the hypothesis that conflict enhancing and alleviating subliminal stimuli differentially effect performance in a manner consistent with the psychoanalytic proposition concerning competitive situations. The author's highlight the efficacy of subliminal exposures noting that for these three groups, 40 of 78 subjects (59%) obtained adjusted scores for the OK condition that were over one hundred points greater than their adjusted score for the wrong condition. In contrast, only one subject had a difference of this magnitude in the opposite direction. For the experiment which failed to achieve significant results, uncontrolled illumination levels were blamed. A subsequent experiment varied illumination levels and found that stimuli exposed

at higher levels failed to produce effects even though stimuli were then closer to supraliminal threshold levels. Results from a discrimination task administered to most subjects following three of the experiments suggest that results cannot be attributed to the availability of partial cues.

The present study is designed to replicate this experiment and to determine whether the magnitude of the subliminal effect can be influenced by subject's cognitive set (i.e., the visualizer-verbalizer cognitive style dimension studied by Richardson, 1977) and cognitive state (analytic-intuitive dimension studied by Sackheim, Packer & Gur, 1977). To accomplish the former goal, detailed procedural information and copies of the original stimuli were obtained (Silverman, personal communication). In order to more clearly specify stimulus conditions for which the effect occurs, ascending threshold data is collected for use in generating the stimuli used in the experiment proper. The procedural differences between the original and current study are discussed in the relevant contexts of the report.

The extension of the original study attempted here involved the manipulation of two cognitive variables previously identified by Sackheim, Packer, and Gur (1977) as "influencing subliminal stimulus recovery". The present report uses the identified cognitive variables in

an entirely different fashion, however, and achieves manipulation of the two variables using more refined criteria.

This extension of the original study addresses an unsettled problem characterizing subliminal perception, in general. That is, the effects attributable to subliminal stimuli are often weak and variable (Dixon, 1971; and the critical discussion of Silverman's paradigm above). This empirical problem has been accounted for either by attributing positive findings to chance or by identifying moderating variables that were not systematically controlled in various investigations. Dixon (1971) suggests the latter is more defensible in light of his review of factors associated with success and failure in obtaining subliminal results.

Several studies suggest that both situational and/or individual difference factors are related to the appearance and strength of subliminal effects. For instance, Fisher and Paul (1959), Fiss (1966), and Murch (1969) found that when subjects were in a state of relaxed passivity, subliminal effects were maximized. Allison (1963) found that when subjects were encouraged to think in analytic/logical, and organized modes, subliminal effects were not found. On the other hand, when the same subjects were encouraged to think globally, intuitively, and freely, subliminal effects were demonstrated. Gordon

(1967), in a post hoc analysis, discovered marked individual differences in college students in susceptibility to subliminal perception. Students from arts and humanities departments showed significant subliminal effects, while students from science and engineering departments did not. Murch (1969) found that subjects who used intuitive strategies produced greater subliminal effects than subjects who attempted to use an analytic, premeditated approach. All of the above studies involved differential effects for the ability to recover the subliminal stimuli after the experimental presentation had occurred.

Overall, Dixon (1971) suggests subliminal effects are more likely to be found when subjects are in a low state of arousal; attention is unselective or broadened; and cognitions are intuitive, global, symbolic and unbound by logical constraints. On the other hand, high levels of arousal, selective or narrowed attention, and convergent, logical, analytic, and organized cognitive states tend to diminish subliminal effects.

Sackheim and Gur (1978) suggested the terms used to describe the characteristics of individuals who appear to differ in susceptibility to subliminal perception are similar to those used to describe individuals who differ in hemisphericity, that is, the tendency to habitually activate one or the other cerebral hemisphere regardless

of the appropriateness of that hemisphere for task demands. Hemispheric involvement in information-processing has been related to two apparently independent factors (Sackheim & Gur, 1978, from which the following is drawn). The first involves functional differences between hemispheres in evolved specializations for information-processing. In general, for most people, the left hemisphere is specialized to perform verbal, analytic, sequential operations; and, the right specializes to perform spatial, synthetic, intuitive operations. The second factor, that of hemisphericity, concerns individual differences in tendencies to activate one or the other hemisphere. This factor has been observed in split-brain patients, but has been more extensively studied in normals primarily through monitoring of conjugate lateral eye movements. Eye-movements have been used since there is evidence, though not unequivocal, that such movement is associated with contralateral hemispheric activation. Lateral eye movements have also been related to a variety of personality differences consistent with the distinction made between the processing modes of the cerebral hemispheres. Thus, right-hemisphericity is found to be related to greater emotionality, use of intuition, greater hypnotic susceptibility, and internalization of anxiety. Left-hemisphericity tends to covary with these

characteristics to a smaller degree.

These studies suggesting individual differences associated with hemisphericity, and the demonstration of Sackheim, Packer and Gur (1977) of the interaction between hemisphericity and magnitude of the subliminal stimulus recovery effect, form the basis for the present extension of Silverman's study. The major concern of the study is to determine the effect of this individual difference variable on the magnitude of the subliminal psychodynamic activation effect. The specific hypothesis is consistent with Sackheim, Packer and Gur (1977), that trait and state hemisphericity will interact with the magnitude of the subliminal psychodynamic activation effect.

Chapter III

Method

Subjects

Subjects for the experiment were 20 males from the Loyola University Department of Psychology undergraduate volunteer subject pool. Only subjects who spent their childhoods in primarily English speaking homes were included (Silverman, Ross, Adler, & Lustig, 1978). Subjects who wear (untinted) glasses or contact lenses for any reason were required to wear them during all tachistoscopic presentations (Silverman, personal communication). All 20 subjects completed both parts of the study. Prior to the actual experiment, an additional 10 subjects drawn from the same population were used for piloting the procedure and for collection of threshold data. Subjects' ages ranged from 17 to 25 years, with a mean age of 19.0 years and a mode age of 19 years.

Materials

The experimental verbal stimuli for the replication include: a) BEATING DAD IS WRONG, and b) BEATING DAD IS OK. Each is printed in letters 1.3-cm high and occupies two lines on a white card. This pictorial stimuli are 4 X 7-cm line drawings intended to be congruous with the verbal messages. Thus, for Stimulus a, the pictorial accompaniment consists of a simple line drawing of older

and younger male figures looking at each other with lips turned downward, clearly conveying negative feeling. For Stimulus b, the pictorial accompaniment is identical, except that the lips are turned up, so that the figures appear to be smiling at each other. The baseline stimuli consist of (relatively) neutral verbal messages and congruous pictures. They include: (a) PEOPLE ARE SITTING, and (b) PEOPLE ARE STANDING. How these stimuli were generated from photocopies of the stimuli used in the original study will be detailed after other materials are discussed.

As in Experiment I of the original study, the stimuli are viewed through an electronically controlled Scientific Prototype three-field tachistoscope (Model N-1000). The viewing distance is 1.3 meters. The exposures of verbal message and picture (each from different fields) last 4-msec each. The tachistoscope is set up so that when the subject looks into the eyepiece, he sees the blank field with red fixation dot, which goes off each time the stimulus fields go on. After the instructions "Ready, set," the picture field is exposed for 4-msec followed by the blank field for 3 seconds followed by the verbal field for 4-msec followed again by the blank field. Then, with 5 seconds of the blank field passing after each pair of exposures, this sequence is repeated three times, thus giving four pairs of exposures

for each condition.

For the dart-throwing competition, an American-style dart board identical to that used in the original study was hung 96 inches from the throwing line with the bottom 58 inches from the floor. The dartboard (manufactured by General Sportscraft of Bergenfield, New Jersey) is 18 inches in diameter and divided into seven equal concentric circles with the following point allotments: 10, 20, 30, 40, 60, 80, and 100 points.⁶ One defect should be noted. Part of the bullseye (the 100 point area) seems to be made of hard wood which the metal darts cannot penetrate. Thus, darts hitting this area and bouncing away from the board were scored as 100 points. The dart-throwing area is situated immediately adjacent to subject's seat for viewing the tachistoscope (see Appendix A-1 "Room Diagram").

Tachistoscopic illumination levels varied across the original experiments and were not reported for Experiment 1 in which the three-field tachistoscope was used. Silverman (personal communication) recommends however that the illumination of the stimulus fields be set at between four and five footlamberts with blank field and room

⁶Since this point allotment does not follow equal intervals, the actual statistical analysis was performed on the following transformed data: 10=1, 20=2, 30=3, 40=4, 60=5, 80=7, 100=8.

illumination two to three times brighter than this.⁷

Averaging these figures, stimulus field illuminations were set at 4.5 footlamberts, and the blank field at 2.5 times brighter or 11.25 footlamberts. Illumination measurements were made using an Ilford photometer with experimental stimulus cards inserted in the fields. All fields were set at "constant-on" positions while measurements were made.⁸ Silverman (personal communication) also notes that subjects' exposure to glare from room lighting may interfere with subliminal registration. For this reason, room lighting was shielded from subjects' direct view thereby eliminating the possibility that glare from the

⁷Experiment II of the original study reports stimulus field illuminations of five footlamberts with the blank field at nine footlamberts. Experiment IV used stimulus fields at five footlamberts with the blank field at fifteen footlamberts. Both experiments used a two-field tachistoscope

⁸It should be noted that after approximately half the subjects had been run, a slight flickering appeared in the stimulus fields when viewed in the "constant-on" position. All light bulbs were changed at this point and illumination levels recalibrated. Unfortunately, the lowest setting for the stimulus fields gave illumination readings slightly higher than those used previously. They were set at 5.1 footlamberts while the blank field remained at 11.25 footlamberts for the duration of the experiment. Additional measurements taken near the end of the experiment showed no more than an eight per cent variation from these figures, well within the standard error of measurement of the instrument at these illumination levels. Data obtained before and after this change were compared to determine the effect, if any, of these slightly differing illumination levels. Swanson (unpublished Master's Thesis, 1979) reports these data in detail. In summary, however, no effect was found for this change in light bulbs.

fluorescent lighting could effect results. Room illumination was measured at 7.6 footlamberts. This measurement was taken of the wall which subjects faced when seated at the tachistoscope and when throwing darts (See Appendix A-I "Room Diagram"). Finally, light reflecting from the tachistoscope housing immediately in front of subjects' chair was measured at 11.2 footlamberts.

Lack of the original stimuli made their exact replication in terms of brightness, sharpness, and contrast impossible. Photocopies of the original stimuli were used on three initial pilot subjects with stimulus fields set at the illumination levels discussed above. These stimuli met the two criteria suggested in the original article (Silverman et al., 1978): a) all pilot subjects reported seeing flickers or flashes of light on four successive exposures of each verbal and pictorial stimuli, b) the flickers or flashes from the two sets of oedipal stimuli could not be distinguished from each other by any subject. The original article (p. 352) also reports ascending threshold data collected for two neutral stimuli. For illumination levels approximating those here, subjects' mean threshold for first reporting anything was 40.2 msec, while mean threshold for correct reading was 66.0 msec. In contrast, pilot subjects in the present study reported partial cues at around 15 msec and correctly read the stimuli at 20 to 25 msec. In his most

recent statement, Silverman (personal communication) recommends that stimuli be constructed so that partial cues are available at about 30 msec and that correct reading occur between 40 and 60 msec. As the first stimuli tested here clearly did not meet these recommendations and the present illumination levels closely approximated those recommended by Silverman, the decision was made to progressively lighten these stimuli so that more comparable threshold data could be obtained.

This was accomplished by photocopying with a piece of tracing paper covering the stimulus cards. This process was repeated on resultant copies three times, so that three gradations of lightness were obtained for each stimulus. Six neutral verbal stimuli and one critical stimulus (YOU DO OK) were copied in this fashion. Following this, ascending threshold data for these 21 cards (7 stimuli X 3 lightness gradations) were obtained from seven subjects drawn from the population described above. Illumination levels for stimulus and blank fields were those to be used in the experiment (i.e., 4.5 and 11.25 footlamberts respectively). Subjects were instructed to report everything they saw, whether a flash, a line, a letter, or a change in brightness, and to report all parts of the stimuli as they were seen. For each threshold determination, the subject was given 45 seconds exposure to the blank field (with fixation dot), told

"Ready," and then exposed to the stimulus for 4 msec. Each stimulus exposure was followed by 4 seconds of the blank field. Stimulus exposure times were increased by 2 msec increments until the subject first reported a partial cue (e.g., a line, a letter) and then in 1 msec increments until a correct reading was made. Threshold data with stimuli grouped according to lightness gradation are presented in Table 1. Each mean reported is based on from 24 to 38 threshold determinations.

Mean threshold scores obtained from the lightest group of stimuli (30.4 msec for first report and 46.1 msec for correct reading) most closely approximate the thresholds recommended by Silverman (30 msec and 40 to 60 msec, respectively). On the basis of these results, all remaining verbal and pictorial stimulus cards were lightened by the process described above so that they approximated this group of stimuli in terms of line thickness and contrast.⁹ (See Appendix B for

⁹These stimuli appeared dramatically lighter than the ones originally obtained. Copies of two of these lightened stimuli and a description of threshold data were sent to Dr. Silverman. He replied that the stimuli appeared no lighter than others he had used in two-field tachistoscope experiments. Further, he reminded the author that no illumination measurements had been made in Experiment I of the original experiment which used a Scientific Prototype three-field tachistoscope comparable to the one used here. This could account for the observed differences.

Table 1

Thresholds in Msec for Stimuli Grouped by LightnessGradation

	<u>Light</u>		<u>Lighter</u>		<u>Lightest</u>	
	<u>Range</u>	<u>Mean</u>	<u>Range</u>	<u>Mean</u>	<u>Range</u>	<u>Mean</u>
Threshold for						
first report	14-40	24.5	16-38	27.2	20-46	30.4
Threshold for						
correct						
reading	18-55	31.8	20-72	39.5	22-94	46.1

photocopies of these stimuli that were used in the experiment proper.)

Procedure for Replication

A verbatim account of the experimenter's interaction with subjects is provided in Appendix A-II. This was adapted with only minor variations from the account obtained from the original authors. The major steps of the procedure are described below.

The subjects were randomly divided between the two experimenters involved in the study with the result that 20 subjects were used by this experimenter. When each subject arrived, he was asked by the experimenter to read an information sheet explaining the rudiments of the experiment and assures confidentiality (see Appendix A-III). He was then asked to sign a consent form (Appendix A-IV). If the form was signed, the subject was told of the dart-throwing competition for which cash prizes of \$12, \$8, and \$5 would be awarded to the three highest scorers. After a brief explanation of the tachistoscope, the subject was given the "priming" material identical to that used in the original study. This consisted of a brief questionnaire (Appendix A-V) involving questions about the subject's relationships with his mother and father, Rorschach card IV (the "father" card), TAT card 7BM (a "father-son" scene), TAT card 6BM

(a "mother-son" scene), and a story recall task. The later involved the subject looking at TAT card 6BM while being read a story (Appendix A-VI) made up by the original authors to contain prominent oedipal elements. He then recalled the story and told it back to the experimenter. The purpose of these procedures was to "prime" the subjects for the oedipal content to be subliminally presented. Silverman (1965) reports that for subliminal effects to be obtained for normal subjects, the mental content that the stimuli were intended to trigger had to be activated by priming beforehand.

After eight practice dart throws, each subject was put through the two conditions of the replication. Each condition consisted of tachistoscopic exposure to a base line stimulus pair and a baseline assessment of dart-throwing (all eight darts were thrown by the subject and then retrieved by the experimenter). This was followed by the tachistoscopic presentation of one of the two experimental oedipal stimuli already described and another eight dart throws. This was followed by the other condition, in which pretest and posttest assessments of dart-throwing were again collected. The sequence of baseline conditions remained fixed for all subjects, while the presentations of the critical stimuli were randomized.

Procedures and Materials for the Extension

This portion of the study began immediately after the subjects completed the replication phase of the experiment outlined in Table 2, as Part 1. The experimenter then briefly introduced the subjects to the idea that the procedure to follow would be slightly different than the procedures just previously performed. Specifically, subjects were given the idea of adopting one of two attitudes, or "states of consciousness", while looking into the tachistoscope and only during this time, not while throwing darts (The verbatim outline of this presentation to subjects is given in Appendix A- I, "Explanation of the Second Phase of the Experiment".). The experimenter assisted the subjects in adopting these attitudes or cognitive-affective "sets" through a series of detailed instructions and task-facilitative inducements (e.g., "I want you to take your time..."; "You will probably begin to adapt a creative strategy of your own to generate this attitude...", etc.). The experimenter emphasized that it was possible to comply with this demand, and that the subject was to rate his ability to actually achieve the desired state on a nine-point scale (see Table 3). This scale was used only to structure the experimental situation in a manner that would require subjects to engage in an earnest effort to achieve the requisite cognitive-state manipulations. It was hypothesized that requiring subjects to rate their

Table 2

Summary of ProcedurePart 1 (Twenty Subjects)

1. Introduction and signing consent forms
 2. Priming procedure
 3. Eight practice dart throws
 4. Baseline 1 stimulation (PEOPLE ARE SITTING)
 5. Baseline 1 dart throws (eight throws for each condition)
 6. Critical 1 stimulation (one of the BEATING DAD stimuli)
 7. Critical 1 dart throws
 8. Baseline 2 stimulation (PEOPLE ARE STANDING)
 9. Baseline 2 dart throws
 10. Critical 2 stimulation (the other BEATING DAD pair)
 11. Critical 2 dart throws.
-

Part 2 (Same Twenty Subjects)

12. Explanation of second phase of the experiment
13. Cognitive set #1 (one of the two cognitive-state sets)
 - Baseline 3 stimulation (PEOPLE ARE THINKING)
 - Baseline 3 dart throws
 - Critical 3 stimulation (one of the BEATING DAD

stimuli)

-Critical 3 dart throws

-Baseline 4 stimulation (PEOPLE ARE TALKING)

-Baseline 4 dart throws

-Critical 4 stimulation (the other BEATING DAD pair)

-Critical 4 dart throws

14. Cognitive set #2 (the other cognitive set pair)

-Baseline 5 stimulation (PEOPLE ARE LOOKING)

-Baseline 5 dart throws

-Critical 5 stimulation (one of the BEATING DAD pair)

-Critical 5 dart throws

-Baseline 6 stimulation (PEOPLE ARE WALKING)

-Baseline 6 dart throws

-Critical 6 stimulation (the other BEATING DAD pair)

-Critical 6 dart throws

15. Discrimination task

16. VVQ Questionnaire

17. Debriefing

Table 3

Cognitive State Manipulation Scale

Impossible	Nearly	Strong	Fairly	Very
	Impossible	Effort	Easy	Easy
1	3	5	7	9

performance would facilitate greater compliance with the experimenter's request. Therefore, the data collected for subjects on this scale is not analyzed in this report.

The procedural outline of this phase of the experiment is given in Part 2 of Table 2. The differences between the two phases of the experiment can be seen in this table. Subjects repeated phase 1 of the experiment two more times (baselines 3, 4, 5, 6; criticals 3, 4, 5, 6) while adopting two different cognitive-affective sets during the stimulation procedures only. Since the order of presentation of the critical stimuli and the cognitive-affective sets was randomized across subjects it is possible to perform a repeated measures analysis of variance and assess the effects of the critical stimuli alone and in interaction with a cognitive-state.

In order to assess the role of hemisphericity as a cognitive-trait, Richardson's (1977) Visualizer-Verbalizer Scale (VVQ) was given to each subject as step 16 (Table 2) of the experiment. Richardson (1977) summarizes the data on the construct validity of this instrument. This summarization was deemed sufficient to warrant use of the VVQ as a means of determining the separation of subjects along the dimension of characteristic hemisphericity as a preferred information-processing mode. The use of the VVQ will allow for a three-way repeated measure factorial design.

Since the VVQ was given at the end of the experiment it was not possible to determine the criterion score for trait-analytic (Verbalizer on Richardson's scale, the VVQ) or trait-intuitive (Visualizer on the VVQ) subjects until after the subjects had completed the experiment. For this reason it was decided that the criterion would be determined on the basis of the obtained distribution of VVQ scores at the end of the experiment. This distribution is given in Table 4. It can be seen in this table that the range of scores is somewhat skewed in the direction of trait-intuitive (visualizers) subjects. However, the empirical criterion score which divides this distribution in half is very similar to the mean VVQ score Richardson found in six-reported studies. In these six studies the reported mean VVQ score ranges from 8.6 - 9.59 (males and females). Therefore, the current criterion cut-off score of nine and below for verbalizers, and ten and above for visualizers, was accepted as reasonable.

The procedure for insuring that the experimenter interacting with the subject was blind to stimulus content should be mentioned here. Before each subject appeared, the co-experimenter randomly chose one of the eight possible orders for critical-stimulus and cognitive-state presentations (the baseline stimuli were on the same order for all subjects, see Table 2). He then placed half of the stimuli (using all available stimulus holders)

Table 4

Frequency Distribution of Scale Scores for the
Visualizer-Verbalizer (VVQ) Scale, VVQ Scale
Range, and Criterion

VVQ Scale Score	5	6	7	8	9	10	11	12
-----------------	---	---	---	---	---	----	----	----

Number of Subjects	1	1	2	3	3	1	6	3
--------------------	---	---	---	---	---	---	---	---

Scale range: 0 - 15 (higher scores are higher visualizers)

Criterion: Trait-Analytic (Verbalizers): 9 or less

Trait-Intuitive (Visualizers): 10 or more

face-down on a table (out of subject's sight) in order of their presentation. Before each tachistoscopic exposure, the subject was asked to look at the blank field (thus providing an approximate 30 second adaption period) while the experimenter inserted the stimulus cards into the fields in such a way as to avoid seeing their front-side. Half-way through the procedure, it was necessary for the co-experimenter to arrange the remaining cards in their order of presentation. Subjects were asked to look at the blank field during this time and the experimenter temporarily left the room. If for any reason, either experimenter or subject had become aware of stimulus content, data for that subject would have been discarded. This did not occur.

Following presentation of the final critical stimuli and subsequent dart throws, all subjects completed a discrimination task patterned closely after that described in the original study. Each subject was given 20 trials in which, under the same conditions as existed during the experiment proper, he was asked to distinguish the flickers made by one of the picture-message units from those made by another. The two BEATING DAD stimuli were presented on one set of ten trials (in random order), while a non-oedipal critical stimulus pair was presented with the PEOPLE ARE WALKING pair in another ten trials (Appendix A-VII).

Finally, subjects were told that a report of experimental results, prize money, and a description of the subliminal content would be mailed to them at the end of the experiment. They had been requested to leave mailing addresses on the questionnaire administered earlier. If at this point, any subject insisted on knowing the content of the stimuli, they were revealed and the subject asked to keep this information secret. Other questions about the experiment were answered and subjects were then encouraged to contact the experimenter by phone at any time with any further concerns or questions. A summary of these procedures appears in Table 2.

Analysis of the Data

Each subject received 12 dart scores (six critical and six baseline) based on the total of the eight darts thrown following each stimulus exposure. Three different analyses were performed on this total set of data. Two of these analyses were performed on subsets of the total set to assess for the effects of a) practice, on the six baseline data sets and b) of the cognitive-trait variable in interaction with practice on the six baseline data set. The final analysis determined the independent effects of the two critical stimuli (OK/WRONG), and of the interaction of the critical stimuli with the two cognitive states, and the two cognitive-trait variables. Finally,

the results of two further analyses performed by the co-experimenter (Robert Swanson) will be summarized since they are pertinent to the overall validity of the study. The latter analyses assess the effect, if any, of the two separate experimenters on the critical-stimulus data; and, of the difference of critical-stimuli effect on the first and last four dart throws for subjects. This last analysis was performed by Swanson (1979) in response to Silverman's (personal communication) suggestion that the experimental effect obtained in the original study may be of short duration.

The first three analyses were done using analysis of variance procedures. The two analyses performed by (Swanson, 1979) were done using t tests.

Chapter Four

Results

Results of the Baseline Data, Practice-Effect Analysis

The means for the six baseline dart score data sets and the one-way analysis of variance for these six means are presented in Table 5. Inspection of Table 5(a) shows clearly that darts scores did not change over trials. Table 5(b) presents the results of the one-way analysis of variance of these mean score indicating no significant, $F_{(5,95)} = 1$, difference between the mean scores. Thus, one possible variable affecting dart scores, i.e., practice, can be safely ruled out.

Since the trait variable of hemisphericity was hypothesized to interact with the subliminal psychodynamic activation effect it appears prudent to determine if this trait variable had an influence on dart scores independent of the subliminal stimuli. Therefore, a two-way analysis of variance, using the baseline dart scores and the hemisphericity trait scores as variables was conducted. Table 6 presents the raw score means and the analysis of variance source table for this analysis. Inspection of the raw scores in Table 6(a), and of the statistical analysis in Table 6(b) reveals that neither hemisphericity, practice, or their interaction created a

Table 5

A.) Means for the Baseline Data

Trials	1	2	3	4	5	6
Means	46.8	47.6	47.4	47.1	47.8	48.8

B.) One-Way Analysis of Variance for Baseline Dart Scores

Source	SS	df	MS	F
Trials	47.76	5	9.55	F<1
Residual	4172.01	95	43.915	
Total		119		

Table 6

A.) Trait Hemisphericity and Baseline Score Means

Baseline	<u>Trait</u>		(Grand Mean)
	1	2	
1	38.1	36.8	37.4
2	38.4	37.7	38.1
3	38.3	37.5	37.9
4	38.8	36.7	37.7
5	38.0	38.5	38.2
6	37.6	40.6	39.1
	38.2	37.9	(Grand Mean)

B.) Two-Way Analysis of Variance on Baseline and Hemisphericity Scores

Source	SS	df	MS	F
<u>Between</u>		(19)		
Trait	1.6	1	1.64	F<1
Error	3123.9	18	173.54	
<u>Within</u>		(100)		
Baseline	32.17	5	6.43	F<1
BT	80.8	5	16.15	F<1
Error	2062.73	90	22.91	
Total		119		

significant effect (F is <1 .)

Results of the Experimenter-Subliminal Stimuli Interaction

Analysis

Swanson (1979), the co-experimenter in this study, conducted an analysis of the possible effect of the two investigators upon the subliminal psychodynamic activation effect. Table 7, as modified from Swanson (1979), presents the means for dart scores obtained following the two BEATING DAD stimuli and their associated baseline stimuli. Results are presented separately for each experimenter and as combined for all 38 subjects. The results of the matched-pairs t test computed for these data are presented in Table 8. These reveal that the only statistically significant result obtained was for Swanson's subjects following exposure to the BEATING DAD IS WRONG stimulus ($p < .01$). Dart scores increased significantly here, a finding directly opposite to the original experiment. The author obtained no effect with the same stimulus. When results for both experimenters are combined, neither of the critical stimuli had a significant effect on the dart scores. These results fail to support Silverman's findings on the effects of subliminal stimulation with these stimuli and, in one instance, are in the opposite direction of his original findings.

Table 7

Mean Critical and Baseline Scores for each
Experimenter *

Stimulus	Swanson (n=18)	Casas (n=20)	Combined (n=38)
<hr/>			
BEATING DAD			
IS OK			
Baseline			
Mean	445.56	461.00	453.69
Critical			
Mean	437.22	468.50	453.68
BEATING DAD			
IS WRONG			
Baseline			
Mean	419.44	456.00	439.74
Critical			
Mean	465.00	451.00	457.63
<hr/>			

* This table is adapted from Swanson (1979),
Table 3.

Table 8

Matched-Pairs t Test Results for Analysis of the
Effect of Each Experimenter on Results

Stimulus	Swanson (n=18)	Casas (n=20)	Combined (n=38)
<hr/>			
BEATING DAD			
IS OK			
Mean difference	8.33	-7.50	-0.00
<u>t</u>	0.34	-0.52	0.00
BEATING DAD			
IS WRONG			
Mean difference	-45.55	7.00	-17.89
<u>t</u>	- 2.94*	0.39	- 1.43
<hr/>			

* $p < .01$.

The statistical significance of differences in results obtained by the two experimenters were assessed by t tests. There was no difference for the BEATING DAD IS OK stimulus, t (36) = 0.558, ns, for contrast, the experimenters obtained significantly different results with the BEATING DAD IS WRONG stimulus, t (36) = 2.137, p < .05. This result suggests an Experimenter or Experimenter x Subject interaction effect and raises serious questions as to the generalizability of the phenomena.

As noted earlier, Silverman has suggested that the psychodynamic effect may be rather short duration following subliminal stimulation. Swanson (1979) tested this proposition by analyzing the data for only the first four dart throws after each stimulation. Swanson (1979), Table 5, presents the mean differences (between critical and associated baseline scores) and matched-pairs t tests computed using only the first four dart throws in each condition. To summarize this analysis, here: These results are the same as those found when all eight dart throw scores are used. No stimulus had an effect on the dart scores, though the reversal of the predicted effects of the BEATING DAD IS WRONG stimulus found earlier, did approach significance here as well. Specifically, Swanson's subjects performed better with this stimulus (p < .10).

Results of the Three-Way Repeated Measures Analysis of Variance.

The results of the overall analysis of variance which includes all three of the variables studied in this experiment are presented in Table 9. This source table reveals that there were no significant effects achieved in the experiment. The only F ratios exceeding a value equal to or larger than one are those for the Oedipal x Hemisphericity Trait, and Hemisphericity State x Hemisphericity Trait interaction analysis. Figure 1 and Figure 2 graphically display the mean dart scores for these analysis, respectively.

The results of this overall analysis do not support the predictions of the study. Specifically, the two critical subliminal stimuli, the hemisphericity trait, and the hemisphericity state variables did not significantly affect the mean dart scores of the subjects studied. Inspection of Figure 1, the graphic display of the Oedipal x Trait Interaction, is not significant statistically. However, the interaction effect suggested by this graph is visualizers and verbalizers respond more similarly to the BEATING DAD IS WRONG stimulus than to the OK stimulus. This result is not predictable from either Silverman's work, or from Sackheim, Packer and Gur's (1977). Figure 2, which graphically displays the interaction of the cognitive state and trait variables, while not significant

Table 9

The Oedipal (A), vs. Cognitive State (B),
vs. Trait (C) Repeated Measures Analysis
of Variance Data

Source	SS	df	MS	F
<hr/>				
Between		(19)		
C	97	1	97	<u>F</u> <1
S(C)	3541.3	18	196.74	
Within		(100)		
A	2.13	1	2.133	<u>F</u> <1
AC	45.63	1	45.63	1.86*
A5(C)	440.9	18	24.49	
B	23.45	2	11.72	<u>F</u> <1
BC	91.55	2	45.77	1.64**
BS(C)	1006.00	36	27.94	
AB	27.516	2	13.75	<u>F</u> <1
ABC	31.02	2	15.50	<u>F</u> <1
ABS(C)	627.80	36	17.43	***
Total		119		

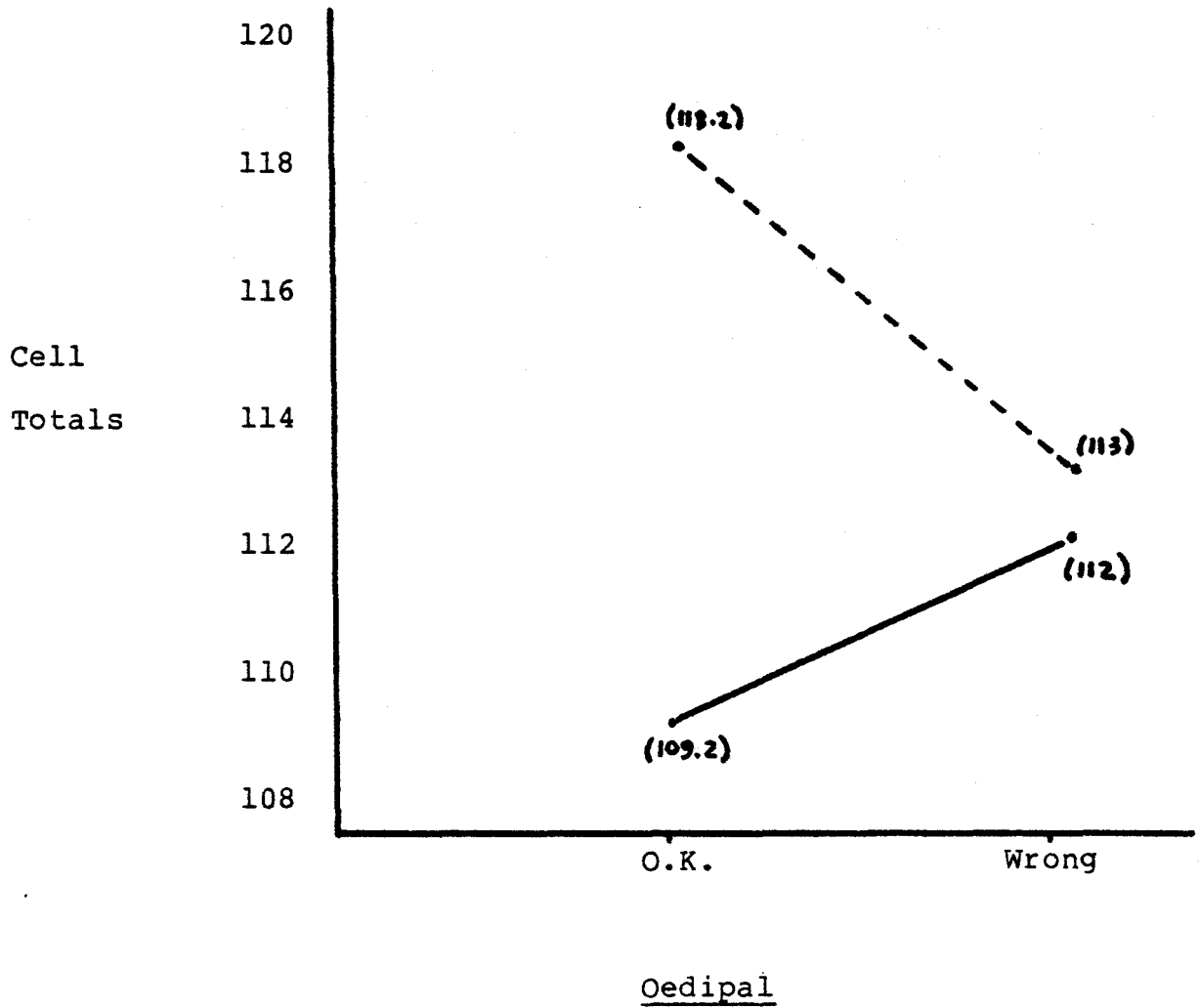
* prob. = .1891

*** Error term not

** prob. = .2085

computable

Figure 1
Oedipal by Trait Interaction

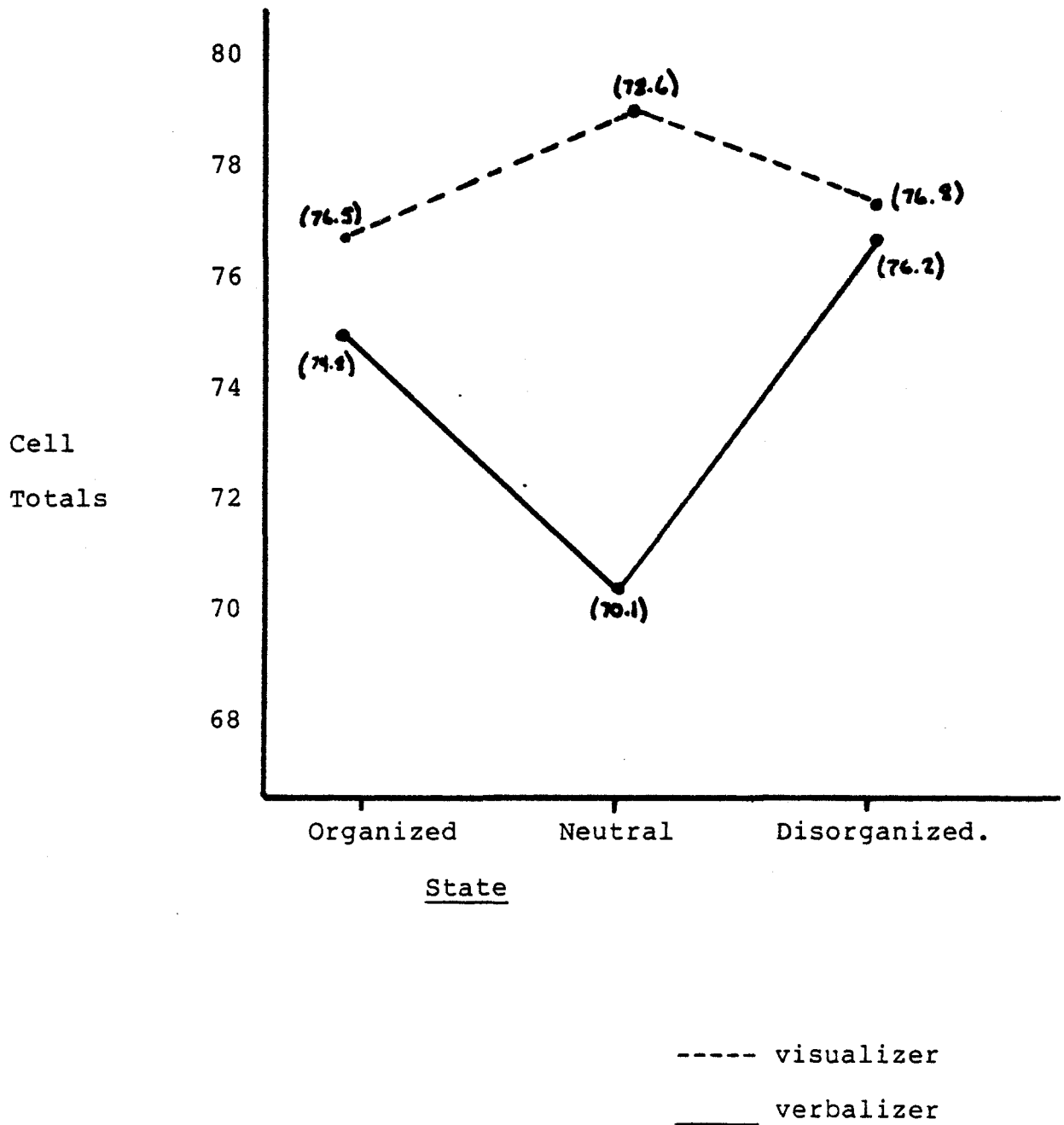


----- visualizers

_____ verbalizers

Figure 2

State-Trait Interaction



is suggestive. The trend displayed in this graph is for visualizers to score higher under the neutral-state condition; and, for verbalizers to score poorer under the neutral condition. Both groups scored similarly under the two other (organized and disorganized) conditions. This trend was not predicted and does not support the prediction made on the basis of Sackheim, Packer, and Gur (1977). The prediction made was that visualizers would show the greatest effect under the organized-state condition; and the verbalizers would show the greatest subliminal effect under the disorganized-state condition. This prediction was not supported.

Chapter V

Discussion

The conclusions that follow from the preceding analysis are that it was not possible to replicate any part of Silverman, Ross, Adler, and Lustig (1978), or Sackheim, Packer, and Gur (1977). It should be noted that the nature of the failure differs for the two cited studies. The current experiment was as an exact a replication of the Silverman et al. (1978) study as is possible using a different group of experimenters, subjects, and laboratory. The failure to replicate the Sackheim, Packer, and Gur (1977) study is of a more limited kind. Specifically, the latter authors demonstrated a hemisphericity interaction effect on subliminal stimulus recovery. The current study, in contrast, failed to find such an interaction with the subliminal psychodynamic activation effect. While the present author fully expected to find this interaction using the subliminal psychodynamic activation paradigm, there is this real difference between the two experiments. Therefore, the failure in this instance is in the inability to generalize the hemisphericity interaction effect across the two subliminal stimulation paradigms.

Since this study was an attempt to independently replicate a larger body of published research it is important to discuss the possible reasons for this unexpected result. The following discussion addresses primarily the inability to replicate Silverman's study. However, attention will first be briefly focused upon the failure to replicate the Sackheim, Packer, and Gur (1977) study.

The hemisphericity-interaction effect found by Sackheim, Packer, and Gur (1977) was predicted by these authors on the basis of previous research on the cognitive state variables influencing the magnitude of subliminal stimulus effects (see the review in Chapter 2 of this report). These authors argued that earlier findings could be most simply understood as the result of trait and state effects of hemisphericity. Much of the earlier subliminal research was conducted prior to the current understanding of the differential processing capacity of the cerebral hemispheres. Therefore, the study conducted by these authors was important insofar as it integrated a larger body of disparate findings. The current inability to replicate the Sackheim, Packer, and Gur (1977) study can perhaps be understood in terms of the procedural difference between them. While the current study attempted to find a hemisphericity interaction effect using the subliminal psychodynamic activation paradigm,

the original study used the subliminal stimulus recovery paradigm. The major difference between the two studies is in the nature of the subliminal effect attempted. The subliminal stimulus recovery paradigm attempts to demonstrate that a subliminal stimulus can effect subsequent verbal associations and imagery. The Silverman paradigm, however, uses subliminal stimuli to aggravate or alleviate pathological symptomatology. More specifically, in this study, the subliminal stimulus was used to effect subsequent competitive psychomotor performance. Therefore, it seems plausible that the recovery paradigm utilizes an intrinsically more comparable stimulus and response relationship; i.e., a visual stimulus and a visual response (imagery), or a linguistic representation of the visual response. The Silverman paradigm is considerably more complex with regard to stimulus-response relationships studied. Therefore, it is possible to attribute the failure to replicate Sackheim, Packer, and Gur (1977) to this procedural variation without having to question the efficacy of the subliminal stimulus effect, as an independent variable, in and of itself.

The conclusion which follows from this argument is that the hemisphericity interaction effect has not been generalized to the subliminal psychodynamic activation paradigm. While this conclusion is disappointing, it is really not very surprising within the context of a large

body of research demonstrating an often disconcerting lack of congruence between cognitions and overt behavior (Ciminero, Calhoun & Adams, 1978; Cone & Hawkins, 1977; Hersen & Bellack, 1976).

The failure to replicate Silverman et al., (1978) is more difficult to understand for several reasons. As previously discussed, the current study provided a nearly exact replication of the original experiment. Further, Silverman's research program is extensive both in the number of experiments performed, and in the quite diverse range of subjects, stimuli, and dependent variables used.

It is not possible to attribute the present results to any of the following experimental parameters: the tachistoscope, the stimuli, the illumination levels, the psychomotor performance variable, the nature of the experimenter-subject interaction, the subject recruitment procedure, or, finally, the double-blind nature of the study. All of these variables were carefully reproduced from the detailed information provided by Silverman in both his published reports and his generous personal communications. The difference between the present operationalization of these variables and that of the earlier study are of a conventionally trivial nature. Specifically, the tachistoscope used was different; however, the illumination levels were well within the parameters identified by Silverman. The ascending

threshold and the discrimination task data are supportive of this assertion. The stimuli used were nearly exact replicas of the ones sent by Silverman; and, the current experimenters received assurances that the contrast between the orthographic and pictorial figures, and the paper, used was similar to that of the original stimuli. Therefore, it is unclear how these variables might account for the very different results of the experiments.

Differences between the subjects used in the two experiments would not be a very plausible explanation for the results as well. The very nature of the hypothesis under study, i.e., the role of oedipal conflicts on competitive behavior, precludes the theoretical plausibility of this variable. Nonetheless, a comparison of the standard sociographic indexes used to equate subject populations, age, and sex; and, of the more specific indexes pertinent to this study, language of origin, and the use of eye-glasses, shows that the present study compares well with the original. Thus, the present subjects had a mean age of 19.0 years; Silverman et al., (1978), used a subject group with a mean age of 19.3, 19.6, and 19.5 years (Experiments 1, 3, 4, respectively). In both studies, all subjects were college males and most were solicited from introductory psychology courses. Subjects whose native language was not English were excluded. Finally, whereas our subjects were drawn from a

private Catholic University enrolling a large percentage of Catholic students it is notable that Silverman et al's., subjects were drawn from a large public university which does not have a religious affiliation. Thus, the role of religious affiliation and history must be considered. Yet, as argued earlier, to invoke this difference would seriously limit the generalizability of the earlier experiment. And furthermore, it would do so in a manner which has consistently been rejected by psychoanalytic theorists (Beisser, 1960). At any rate, this issue is not answerable within the context of the present set of experiments since data relevant to this issue was not collected either by Silverman et al., or the present experimenters.

Another potential variable to consider is that of the differences between the actual experimenters used in the two studies. With regard to age, both sets of experimenters were within the 20 to 30 year old range; and were male experimenters as well. Though differences in the personalities and interpersonal styles of the experimenters no doubt exists, this variable does little to clarify the obtained disparity. That is, while such differences assuredly exist, several factors mitigate the role of such differences in influencing the outcome of the two studies. Specifically, the communications between subjects and experimenters were carefully and comparably

systematized across both studies. Therefore, it is difficult to specify what might be attributed to personality differences that would also reasonably be useful in accounting for the obtained outcome differences.

The preceding discussion of differences in methods, materials, and subjects between experiments occurs, of course, within the context of the fact that such differences can never be completely eliminated when independent studies are conducted. The magnitude of the differences which are inevitable, however, can be controlled within theoretically and empirically established limits. The comparisons just made between the studies documents the care with which the current experiment was conducted to conform to these known limits. Thus, the results of the present experiment do not support the claim made by Silverman et al. (1978) that the predicted effects are reliable and powerful. Indeed, it is likely that the original effect was dependent on highly specific uncontrolled, and unspecified variables.¹⁰

¹⁰It should be noted that this statement is made with the only significant result of the experiment clearly in mind. Thus, the reversal of the predicted effect is most parsimoniously explained as a Type I error resulting from the large number of t tests used in analyzing the data of Swanson's (1979) study. The latter author adopts this position, as well, in his analysis of this result.

This conclusion warrants a more extended discussion of Silverman's programatic research effort with the goal of understanding how this result could have occurred. While most reviewers of the subliminal perception research (e.g., Dixon, 1971; Eriksen, 1960; Wolitzky & Wachtel, 1973) have found this phenomena to be an elusive and subtle one, the current study is probably unique in the care taken in the effort to replicate.

Within the broad effort to use psychoanalytic theory as a framework for subliminal perception research (e.g., Klein, 1970; Pine, 1960; Silverman, 1976;), several features of the research program can be highlighted as contributing to inconsistency across studies. The most glaring of these is the often considerable disparity between the level of theoretical complexity employed and operational sophistication achieved. While Silverman's (1976) application of psychoanalytic theory to his data is rigorous, the same can not be said of his programatic operationalization of this theory. For example, Silverman (1976) argues that a complex verbally coded message can bypass the usual means of reception and directly effect unconscious wishes and fantasies. He also argues that since the normal means of reception are being bypassed, the theoretically predicted operation of defensive processes can be bypassed, as well. While this argument appears superficially plausible, it rapidly becomes clear

that this formulation obscures rather than clarifies the nature of the processes involved. Thus, it is unclear how a supraliminal message differs from a subliminal one; and, how this unspecified difference might be sufficient to allow the latter to bypass defensive processes. Further, it is not clear how, or why, a subliminal stimulus would selectively stimulate unconscious fantasies and wishes, rather the cognitive processes more directly responsible for conscious experience.

While there was one significant result in Swanson's (1979) analysis of the data of this experiment it is most parsimoniously interpreted as a statistical artifact. Therefore, on the basis of the current data the questions just raised can be given provisional answers. Specifically, Silverman, Ross, Adler, and Lustig's (1978) conclusions that their paradigm is robust and repeatable, that subliminal stimulation can directly activate unconscious wishes or conflicts leading to predictable behavioral consequences, are not supported by the current experiment. This conclusion is supported by the previously cited studies of Greenberg (1977), and Emmelkamp and Straatman (1976) who also obtained negative findings. Though these studies have already been criticized on methodological grounds it is nonetheless important to cite them as early instances of what is becoming a repeated inability to replicate the findings

published by Silverman as part of his research program.

It appears, then, that subliminal research has not progressed beyond the point where the conclusions relevant to earlier reviews (i.e., Eriksen, 1960; Wolitzky & Wachtel, 1973) can still be reiterated. The findings of subliminal research are elusive, and difficult to replicate.

While it is not possible, here, to suggest directions for clarification of issues in future research in the area of subliminal perception as a whole it is possible to identify several problematic areas requiring attention within the subliminal psychodynamic activation paradigm. Two issues previously mentioned are important enough to elaborate upon. It is reasonable to assume that Silverman has previously ignored the question of how an extremely brief, complex verbal message can stimulate unconscious fantasies because he believed he had robust data empirically demonstrating significant experimental effects consistent with this hypothesis. Without such solid support, indeed, with only conflicting support available, it becomes necessary for him to provide a reasonable account for the inconsistencies obtained by other investigators. Since it is unlikely that the processes mediating the subliminal effect will be understood in the near future, it is probably more useful to determine more carefully the stimulus - response

parameters involved in his studies. Toward that end, research in the following areas is warranted.

First, there is the question of stimulus parameters at the psychophysical level. That is, what are the temporal and luminance levels sufficient or necessary for a truly effective stimulus to operate without also stimulating a subject's conscious involvement. It has been demonstrated that individuals differ widely in their rates of processing briefly presented visual stimuli (Browning-Crinion, Dolmetsch, & Mayzner, 1978).

Therefore, it is likely that stimulus parameters for a subliminal effect will be different across individuals.

Secondly, while psychoanalytic theory is based on the assumption of universal developmental crises which must be resolved in development, it also assumes that such resolutions are invariably unique, or ideographic in nature. Therefore, it is important to determine not only the class of stimuli (e.g., Oedipal) relevant to a particular developmental crisis, but also the particular stimuli which, for each individual, constitute the realization of that category. In the current experiment, for example, there may have been subjects who achieved an oedipal resolution allowing them to beat their father in competitive games. However, these same subjects may be unable to compete with father in the area of professional development because this was the arena in which mother

displayed her favors for successful competition. Therefore, here as well, future developments will have to take into account individual differences.

The above considerations highlight the importance of further research into the basic parameters of the subliminal psychodynamic activation paradigm. Unfortunately, currently available data does not provide clear avenues for further research. The co-experimenter in this study, Swanson (1979), with tongue in cheek, entitled his thesis "Subliminal Psychodynamic Activation and its Relation to the Unconscious: Royal Road or Blind Alley?". On the basis of the preceding study it is perhaps fairest to answer the question as follows: It is neither a Royal Road nor a Blind Alley, it is a Wilderness.

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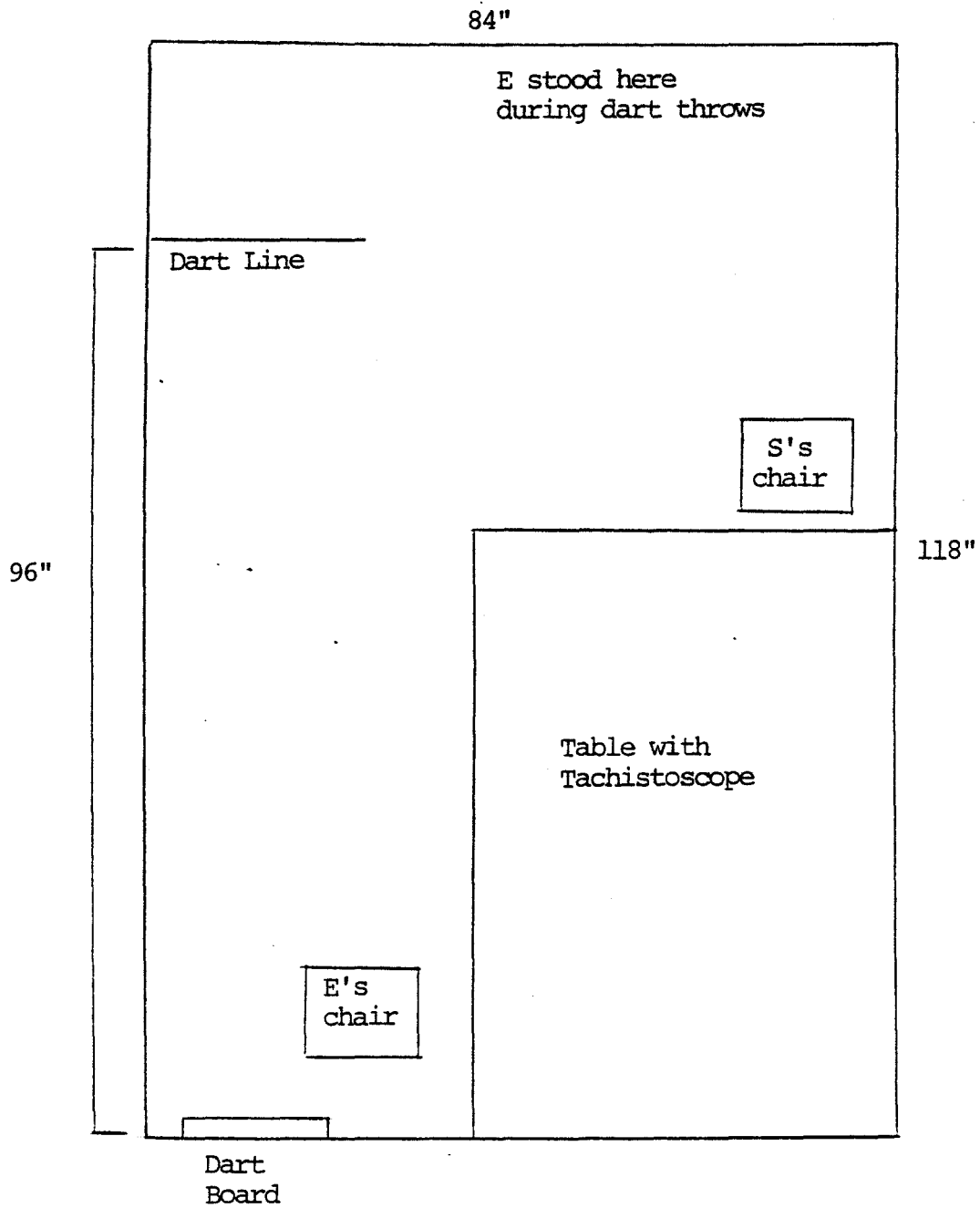
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APPENDIX A

I. Room Diagram

II. Details of Experimenter-Subject Interaction

Before S arrives: Turn on tach. Adjust times and illumination levels. Arrange materials.

When S arrives: "I'm _____ and as you may know this is a study of factors that influence competitive performance. We can begin by your reading this information sheet." (Show S information sheet, have him sign consent form, then say) "In addition to what was described on there, I want to add that the tournament part of the experiment will involve your throwing darts at the dart board up there. Before we get to that, however, let me explain about this equipment here."

Reassurance about tach: "The equipment here is called a tachistoscope, and will be used in the experiment. It can regulate precisely the amount of time a picture or message can be flashed and seen. In this experiment we will be flashing messages or pictures at a speed of four one-thousands of a second, a speed at which you would probably be aware only of a brief flash or flicker of light. The messages or pictures should register in your mind however, and after the experiment you will have an opportunity to find out about the content of the stimuli you were shown. Do you wear corrective lenses for any reason?" [If so, be sure S wears them during tach exposures.]

Questionnaire: "Now I would like you to fill out this questionnaire." [Be sure S includes his mailing address.]

Rorschach Card 4: "Now I am going to show you an ink blot, and I want you to tell me what you imagine you see. There are no right or wrong answers. Different people imagine different kinds of things. If you should see more than one thing in the card, then tell me everything it looks like to you." [Do inquiry as to location only and allow no more than 8 responses.]

TAT Card 7 BM: "Now I am going to show you a picture, and I would like you to make up a story about the picture, having a past, present, and a future or outcome." [Inquire into outcome if not spontaneously given. Inquire if an emotional description is used that is unclear.]

TAT Card 6 BM: "Now I am going to show you another

picture, and I would like you to make up a story about the picture, having a past, present, and a future or outcome.

TAT Story (to Card 6 BM) and Recall: "Now I am going to read you a story we made up for the purpose of this experiment about this picture, and I will ask you to recall it back to me after I finish reading it." [Read story.] "I would like you to recall the story as best you can, and tell it back to me."

Explanation of Tournament: "Okay, now we come to the tournament. As you can see, the top places so far are listed over here. The top three places in the tournament will receive cash prizes of \$12, \$8, and \$5. I am going to have you throw a total of 96 darts. You will throw 12 series of eight darts, and before each series you will sit down and look into the tach. Your grand score will count in the tournament. Before I give you the instructions about that, why don't you step over there and throw eight practice darts? Stand behind that line and throw all eight darts. Make sure you throw them hard enough so they stick. If a dart doesn't stick in, or if it falls out, your score for that throw will be zero. However, if a dart falls out of the bullseye, it will count as 100 points." [S throws eight darts. After each series of eight darts, return darts to table next to S.]

Tournament Procedure: "Now I want you to sit in that chair and look into the tach. I will be at the controls over here, and I will say 'Ready, set' and then press a button which will produce two flickers of light three seconds apart. After seeing several flashes you will get up, walk to the line, and throw a series of eight darts. Then you will sit down and look into the tach again. In a while, my co-worker will come in and change the cards being put the tach. That way, neither of us will know exactly what is being shown. If you have any questions, hold them until the end of the experiment, and we can discuss them then. Now, look into the tach. Do you see a red dot? Okay, try to focus on that. During the time we are doing this part of the experiment, try not to blink, and don't look up from the machine. I will show you a set of flashes, wait a few seconds, then show you another set. You will see four sets of flickers in all. Okay. Ready, set..." [After first few sets of flashes, ask] "Did you see any flickers? Tell me what you saw." [Then instruct S to just tell you if they don't see any

flickers.]

Explanation of Second Phase of Experiment: O.K., now we've come to the second phase of this experiment. In the first part, as you now know, we have been looking at the effects of the pictures we have been presenting to you on your performance. Now, we are going to modify this procedure slightly so that we can study the effects of how your state of mind during the picture stimulation effects your performance. What I'm going to do now is ask you to adopt one of two attitudes, or goals while you are looking in the tach. I would like to emphasize that I want you to adopt this attitude only while you are looking into the tach. Once you stand up to throw the eight darts I want you to try your hardest, again, to score bullseyes. Since the attitudes I want you to adopt are familiar to you in your own experience, this will probably be easy for you. However, I will give you a little time while you are sitting in front of the tach, and before I present the stimuli, to generate this attitude within yourself. So, we will probably be going a little slower during this phase of the experiment and I don't want you to worry about this. We have plenty of time and I want you to take your time while you are inducing this attitude. You will probably begin to adopt a creative strategy of your own to generate this attitude before you look in the tach, so I will try to be sensitive to the efforts you are making. Please feel free to let me know how successful or unsuccessful you feel you are in generating the attitude. One signal which we can use to let me know when you are ready is for you to look into the tach, at that point, I will run through the stimulus cycle, and then you can throw the darts. If this procedure is uncomfortable for you personally, we can try another. Any questions? [Answer any questions that relate to the procedure to be followed but not about the attitudes]. O.K., lets begin by trying to adopt an attitude of...[Cognitive set #1 or #2.]

Cognitive Set #1: Analytic and Discursive

I would now like you to try and identify the stimuli I'm going to be presenting to you. There is a particular way I would like you to try and perceive the stimuli; however, try and think of yourself, and your goal, as that of identifying all the separate and unique elements in the picture. Your goal is to try and identify and catalog precisely the angles and curves of the figures. You want

to know exactly how the figure is supposed to be effecting you and the elements in the figure that have this influencing effect. Think of how each thing you want to identify is related to every other thing. This type of attitude may be clearer if I give you an example. Suppose you are watching an instant replay of a football play, what you want to do is identify the key players in the play and how they accomplished their goal. Furthermore you will want to tell this to your friend who missed the play but who is depending upon you to identify the key actions and players for him. O.K., is this clear for you? (If not, inquire and try to help S understand with another example if necessary.) Alright, now, I want you to generate this attitude in yourself and when you think you are ready just look into the tach, you don't have to say anything to me, and I will start the cycle.

Cognitive Set #2: Global and Intuitive

I would now like you to try and identify the stimuli I'm going to be presenting to you. There is a particular way I would like you to try and perceive the stimuli; however, I want you to try to think of yourself, and your goal, as that of an artist or musician trying to understand and resonate to the elements or brush strokes that create a particular musical score or visual effect. You should feel quite free to be impressionistic and non-precise. Your goal is to get a "feel" for the pictures I'm presenting. You should be less concerned with what I'm presenting to you and more concerned with the pictures themselves. It's best not to try to be consistent or/even organized in the way you are looking. Rather, I want you to try to absorb the pictures. Try to look into the tach as if you were about to see a very old and familiar person or thing. All you should be concerned with is that you are about to see the pictures, and you are feeling all sorts of impressions and feelings. You shouldn't try to organize your impressions - just let them flow through you. O.K., is this clear for you?

Discrimination Task: [See instruction sheet]

Debriefing: "We are finished now. As I told you at the beginning, our interest in this experiment was to see whether your dart throwing could be effected by the subliminal messages you were receiving. What we plan to do at the end of this experiment is to send a letter to all of our subjects and tell you what the results of the study were. We will also tell you the exact messages that you subliminally received. We would prefer to wait until everybody has been run through the study before revealing

to anyone what the subliminal stimuli are. Is that alright with you?" [If S insists on knowing at this time what the stimuli are, reveal them to him and ask him to keep this information secret.] "If you think of any other questions or have any other concerns related to this study, feel free to contact me at any time at the number listed on the scheduling card."

VVQ given to subjects.

III. Information about "The Effect on Competitive Performance Through Subliminal Presentation of Conflictual and Non-Conflictual Stimuli"

There are many things which affect a person's competitive performance. One important group of factors, we believe, is the way in which people see, and/or remember, faint or indistinct experiences. By experimentally studying this group of factors in people involved in competitive situations we hope to better understand how performance may be hindered or improved.

If you decide to participate in this study you will be asked to throw darts at a dartboard, answer some questions, make up short stories, and look at quickly flashed lights which will be words or pictures. From past experience with these or similar procedures we expect no ill effect to you. Also, we expect to learn a great deal about how competitive performance is affected, which, hopefully, will be useful one day in helping people in various realms of endeavor.

You do not have to participate in this study, and if you do agree to participate you can still change your mind at any time and withdraw from the study. Your decision will in no way be held against you. This is simply a research study. All information will remain strictly confidential.

IV. Standard Consent Form

Please Read Carefully Before Signing

I have agreed to participate in the experiment "Tournament" and hereby give my consent to be a subject. The experimenter has explained the procedures of the experiment to me and has described discomforts or inconveniences I may be subjected to, if any. I understand that my responses will be kept in the strictest of confidence and anonymity. I have the option to withdraw from this experiment at any time and I also have the right to request that my responses not be used.

 Experimenter's Signature

SUBJECT'S SIGNATURES

[illegible]

V. PRIMING QUESTIONNAIRE

Name _____ Age _____

Address _____ Phone # _____

Level of Education _____ G.P.A. _____ Married? _____ Parent? _____

Father's Occupation _____ Your Occupational Goal _____

By circling the appropriate letter please indicate to what extent you agree or disagree with the statements below.

- a.) strongly agree
- b.) agree
- c.) disagree
- d.) strongly disagree

A. I am a competitive person.

a b c d

B. I would rather be "alone, at the top" than part of the masses.

a b c d

C. I have a relatively conflict-free relationship with my mother.

a b c d

D. I am close with my mother.

a b c d

E. I have a relatively conflict-free relationship with my father.

a b c d

F. I am close with my father.

a b c d

G. It is difficult for me to be assertive with other people.

a b c d

H. I am prone to feel guilty about things more than most people.

a b c d

I. Most people would consider my father a success.

a b c d

J. I consider my father a success.

a b c d

VI. Story for Story Recall (to Card 6 BM)

(Let S look at card while listening to the story)

This is a mother and her son standing there in a state of stunned silence. Just moments before, the father was also there, but he has stormed out of the room feeling extremely angry towards his son. They had had a loud argument in which the son told his father that he was no longer competent to run the family business, that he should retire, and that he (the son) should take over. Since the mother plays an important role in the running of the business, this would give the son an opportunity to fulfill a long-harbored secret wish of his: to spend more time with her and enjoy more often the closeness they've shared in the past. In his anger at being criticized by his son, the father ostracizes the son and threatened to exclude him altogether from the family business. As he stormed out of the room he cautioned: "Just remember who's still the father around here". The son is now feeling guilty and fears that he may have overstepped his bounds. He is also afraid that he has threatened the closeness which he and his father often experience together. The mother is torn between her love for her husband and her love for her son.

VII. Discrimination Task

"Okay, there's just one more thing we're going to do. I have two sets of cards here and I want to see whether you can tell them apart when I flash them on at the same speed I did during the experiment. Try as hard as you can because the person who does the best on this will win a \$5 cash prize. I am going to show you four pairs of exposures of one set of slides, which will be followed by four pairs of exposures of either the same set or a different set. After the second set of four exposures and after each set after that I want you to tell me whether you think the set you just saw was the same or different than the set right before it. You will be comparing each set of exposures to the set you saw right before it. Okay, now if you would put your eyes up against the viewer, we can get started. During this task, please don't look up; keep your eyes focused into the machine. Here's four exposures of the first set (exposures). Now I'm going to show you four more exposures of either the same or a different set. Just say 'same' or 'different' to indicate what you think (exposures). Now for another four exposures and tell me if they are the same as or different than the one you just saw (exposures)."

Continue, following the order of trials in column I below.

"Now we're going to do the same thing with another two sets of cards. Here are four exposures of the first set (exposures). Now here are four exposures of another set and like before you say 'same' or 'different' (exposures)." Follow the order of trials in column II below.

Give the ten trials in column I utilizing the BEATING DAD IS OK and BEATING DAD IS WRONG stimulus pairs. Then give the ten trials in column II utilizing the PEOPLE ARE WALKING and one of the additional critical stimuli pairs (e.g., YOU DO OK stimuli pair). Be sure to show both the verbal and the pictorial stimuli for each set of exposures.

N.B. When you put in the same stimulus be sure to pull it out of the chamber and put it in again so that S is not cued by the sound of what you are doing as to whether the next exposures will be 'same' or 'different'. Also, attempt to shield the pictorial stimuli from S's view when putting it into the tach.

I
S _____
D _____
D _____
S _____
S _____
S _____
D _____
D _____
S _____
D _____

II
D _____
S _____
S _____
D _____
D _____
D _____
S _____
S _____
D _____
S _____

APPENDIX B

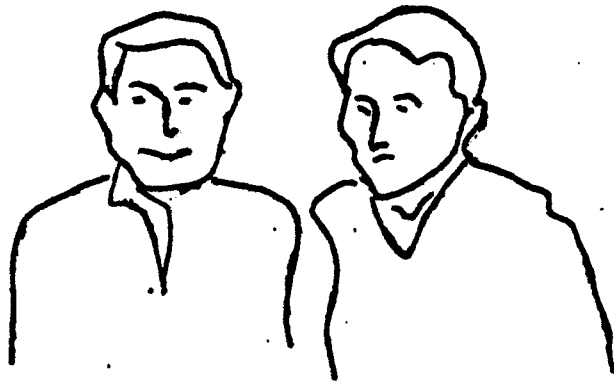
BEATING DAD
IS O.K.



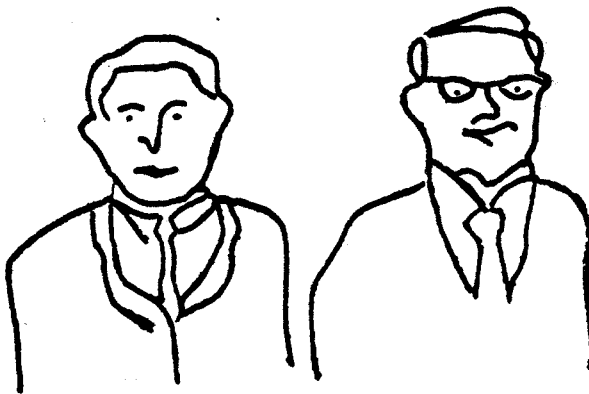
BEATING DAD
IS WRONG



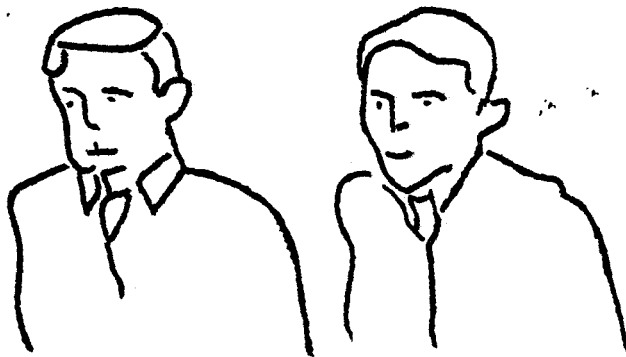
PEOPLE ARE
SITTING



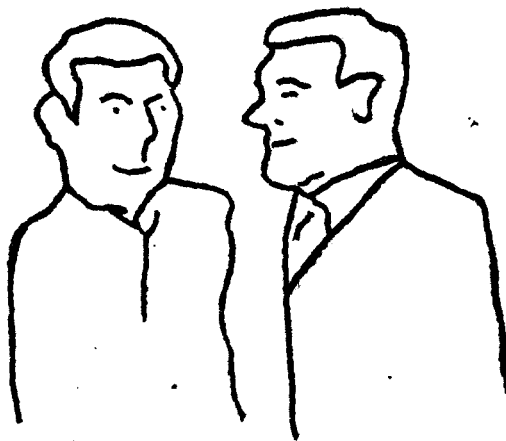
PEOPLE ARE
STANDING



PEOPLE ARE
THINKING



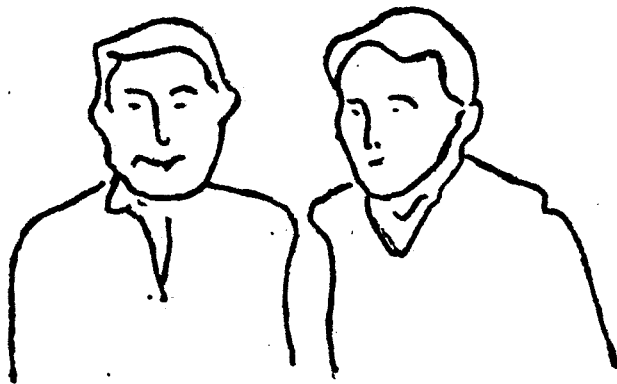
PEOPLE ARE TALKING



PEOPLE ARE
LOOKING



PEOPLE ARE WALKING



APPROVAL SHEET

The thesis submitted by Robert C. Casas has been read and approved by the following committee:

Dr. Mark S. Mayzner, Director
Professor of Psychology, Experimental, Loyola

Dr. Alan S. DeWolfe
Professor of Psychology, Clinical, Loyola

The final copies have been examined by the director of the thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the thesis is now given final approval by the Committee with reference to content and form.

The thesis is therefore accepted in partial fulfillment of the requirements for the degree of Master of Arts.

Date

April 1, 1982

Director's Signature

Mark S. Mayzner